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*Gordon, Harry H.: Feeding of Premature Infants, American Journal of Diseases of Children 73:713 (June) 1947.

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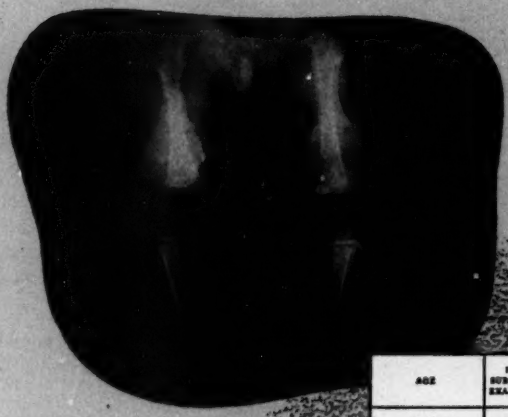

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16–30 da.	90	1	—	41	1	49	0
1 mo.	99	0	0	48	0	51	0
2 mo.	90	2	2.2	34	2	56	0
3 mo.	69	3	4.3	31	3	38	0
4 mo.	79	2	2.5	26	1	53	1
5 mo.	73	12	16.5	25	3	48	9
6 mo.	53	13	24.5	19	5	34	8
7 mo.	54	10	18.5	22	7	32	3
8 mo.	40	5	12.5	18	2	22	3
9 mo.	38	10	26.3	12	4	26	6
10 mo.	41	5	12.2	16	0	25	5
11 mo.	40	3	7.5	12	0	28	3
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Bull. Johns Hopkins Hosp. 87:569, 1950.

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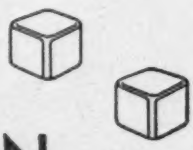

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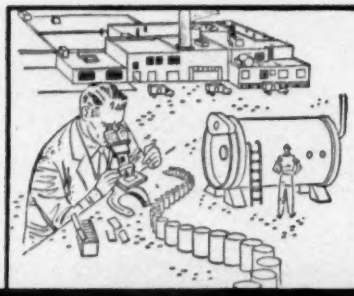

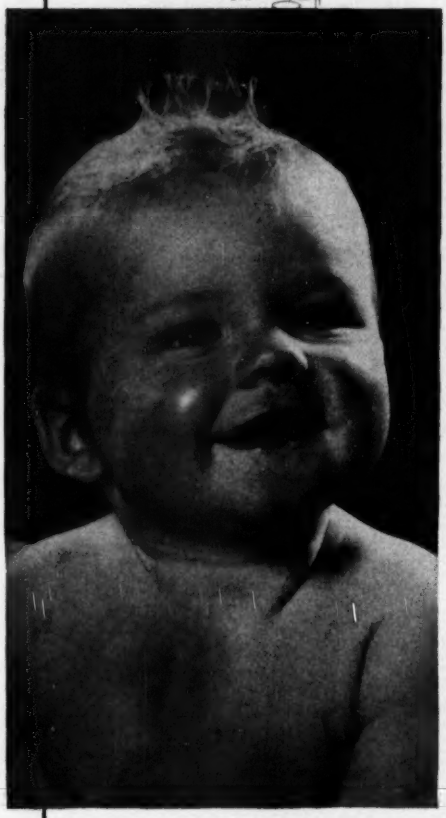

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GROWTH OF THE INDIVIDUAL'S CONCEPT OF SELF

Theory and Some Pediatric Considerations

BERNARD ZUGER, M.D.
NEW YORK

THE FINAL significance for the individual of any feature of his growth and development will depend on his own concept of himself. By the phrase concept of himself (or self-concept) is meant how the individual sees himself in relation to the world around him. As an illustration of the force of this self-concept one may consider the case of the adolescent whose good I. Q. is rendered ineffectual by the pervasive feeling he has of being stupid. The result of objective testing of his mental powers, important though it may be in the assessment of his potentialities, fails to account for his performance.

In a sense, then, there are two general ways of looking at psychological data, from an outer or observational frame of reference and from an inner, personal or motivational one. The observational approach has added much to our knowledge of childhood behavior. One need only mention the outstanding studies of Gesell to bring out the immense value of such an approach. However, a full understanding of the child is impossible unless one also applies an inner frame of reference. The attempt to ferret out the inner, motivational forces may be difficult and uncertain, especially early in childhood, and may yield only an inferential approximation. It is nevertheless the only way in which we may gain a sense of the particular personality of the individual. It is in understanding this inner frame of reference that modern psychiatry and psychoanalysis have made major contributions.

The purpose of this paper is to present a theory of the development of the individual's concept of himself according to such an inner frame of reference. It will be shown how some of the newer knowledge of child psychiatry fits in with such a theory, and an attempt will be made to point out the value of such a developmental schema for the clues it may give us in regard to some aspects of mental health and mental illness.

The development of a concept of self can be roughly divided into three stages, which will here be referred to as those of (1) self-discovery, (2) self-possession, and (3) self-direction (Chart). These stages are not to be conceived of as sharply demarcated from one another but rather as overlapping and imperceptibly merging into each other. Furthermore, what happens to the organism at one stage will influence it in the stage that follows. The whole development will have the character of a dynamic, expanding process, as do all biological phenomena.

From the Neuropsychiatric Clinic of the Greenwich Hospital, Greenwich, Conn.

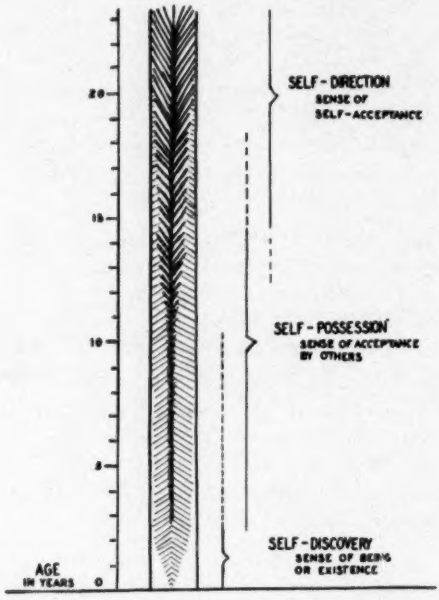
Presented in part at the International Congress for Psychotherapeutics, Sept. 5, 1951, Leiden, Netherlands.

A description of the various stages will be presented first. Then will follow a discussion of their possible clinical relevance. This should attest to the value or lack of value of such a division into stages.

I

Stage I.—The stage of self-discovery ("It is I.").

This stage begins at birth and reaches a climax by 2 to 3 years of age. This is the stage in which the infant and child becomes aware of his being an entity, a "somebody." He can do this only in terms of his total body functioning. This has two aspects: the functioning itself and the feeling tone that goes along with the functioning.



Schematic representation of the stages in the growth of the individual's concept of self.

Much has been written about the functioning proper from the observational frame of reference, such as the age at which a child smiles, reaches for things, and so on. Here we may concern ourselves with the development of the consciousness that it is he who is functioning and that the various bodily functionings are crystallizing out as a new entity, "I."

Even this aspect of the development of his self-concept cannot take place in a vacuum. It can only be done in relation to human beings. His functioning becomes real to him by virtue of the response given to it. His movement, his crying, his defecating, his smiling then come to have meaning for him as "I." There may also be a greater unifying and interconnecting of these activities in terms of himself, because the same person or persons (the family circle) are constantly present to respond to them.

Inseparable, however, from the rest of the process of becoming aware of himself as an entity is the feeling tone that develops between him and the individuals in relation to whom he attains this awareness. It is not the mere perception, the identification, and the coming together of all the functionings as "I," but also the way his whole organism reacts to the process. In an atmosphere of warmth, which is communicated to him by sound, touch, color, movement, and so on, it feels good to become aware of himself in relation to other persons.

If the human contact has been adequate in quality and quantity, enough of his feeling and his functioning will have come together by 2 to 3 years of age to be recognized as "I." He is no longer merely this or that presenting part or function, or the sum total of them. There is the beginning recognition of himself and of the world as separate entities. (This distinction will gradually grow greater, though never be complete.) Conceptual thinking has begun. Conscious behavior has begun to supplant reflex and conditioned response. Only at this time have we really begun to deal with the beginnings of an individual. In the nature of this development may lie the explanation for the absence of infantile memories antedating this period. It may also explain why bowel training before this time is usually unsuccessful except in a sort of conditioned-reflex, mechanical way, subject to frequent relapses.

Stage II.—The stage of self-possession, during which the self-concept is a function of acceptance by others ("I am such and such an I, do you like me?").

With his beginning awareness of himself as an individual, the child not only enters another stage of development but in a sense begins a process of being reborn. At his actual birth the child had no say in what he became and in being where he was. Now he must begin to take possession of himself—his present body, his present functioning, what he will grow into, and the functionings he will later develop. As growth proceeds it becomes important that he integrate previous attitudes and orientations into his present concept of himself. Only to the extent that his past is successfully incorporated into his present awareness of himself is he really in possession of himself. It is interesting that ordinary language says just that in describing a person as being "self-possessed," that is, "in control of [his] powers" (Webster). To the extent that the individual does not take possession of himself, a dualism arises within him between his organizing self-concept and that which remains unincorporated in it. With further growth, this dualism may become more and more marked and contribute greatly to unconscious motivation and alienation from his organic self (i. e., from his feelings).

Specifically, the second stage begins at about 2 to 3 years of age and lasts a variable length of time through the adolescent period, to end at about 18 years, when Stage III, the period of self-direction, begins. During Stage II the child continues to undergo changes in body size, weight, and form, which he will have to incorporate into his self-concept, as he did with what he acquired from Stage I.

The basic inner motivation of Stage II is the child's need for acceptance by others (parents).[1] In the first stage, if the operating factors are healthy, human beings become a part of his world and are included in his self-concept. He molds himself after them (in posture, speech, etc.). Approval and disapproval by them become

1. Sullivan, H. S.: Conceptions of Modern Psychiatry: First William Alanson White Memorial Lectures, Psychiatry **3**:1, 1940.

an essential factor in his life, and remain the predominant guide to his self-value during Stage II. The sensitiveness of the child and young adolescent to comparisons between himself and others is very marked. It is in an atmosphere of acceptance of himself by others that he begins a process of self-exploration through experience with the aim of building up his own powers and values so that he may assume direction for his own life.

Sex development may be taken as an example to illustrate the forces at work in Stage II.[2] The child must first become aware of his sex anatomy by handling it. Even this initial step may be met with disapproval, as in attempts of mothers to stop their children from exploring themselves or in their concern at the first evidence of physiological functioning (e. g., erection). Such attitudes make it more difficult for the child to incorporate that part of himself into his concept of "I," or they enable him to do so only with uncertainty and misgivings. Subsequent steps in the taking over of his sex desire and sex need may indicate even more clearly whether or not the primary forces of this stage, namely, acceptance by others, is operating in the direction of healthy or unhealthy growth. In the case of healthy growth the child will accept his sex desire and sex need as part of himself and will take active measures to satisfy them either by masturbation or, later, by sexual intercourse. Subsequently he may decide to do one or the other or neither. In any case, he has been allowed to accept his sex functioning as his, and what he does will be his decision and his responsibility and will be in accordance with other values he has had a chance to develop similarly. In the case of unhealthy growth, on the other hand, there may be suppression of sex discovery and exploration and of sex desire. Masturbation may be completely suppressed for many years after some initial attempts, or there may be a hostile defiance of all sex restraints. Which of these manifestations will develop depends on the neurotic character structure that takes the place of healthy maturation.

Stage III.—The stage of self-direction (maturity) in which the self-concept is a function of self-acceptance ("I am such and such an I because that is the kind I want to be.").

In Stage I, when enough of body functioning has come together into a psychological unit, the concept of "I" as an entity is born. In Stage II, when the individual (during his childhood, adolescence, and young adulthood) becomes aware of a hierarchy of values from his cultural environment that he accepts as his own and to which he commits himself with his feelings and his energies, "I" as a self-directing entity is born. The chief of these values is the value for himself—his feelings, his thoughts, his experience, his work, and his background, its "goodness" and "badness," its pleasures and pains, its advantages and disadvantages. In Stage II the direction for his life came essentially from outside himself. In Stage III it comes essentially from within himself. He has taken over his own growth. He has acquired the capacity to metabolize his experience just as he has always possessed the capacity to metabolize various nutrients and thereby incorporate them into his own protoplasm.

2. Another example could be the choice of an occupation, but it might not be sufficiently illustrative of the considerable opposing forces the child may have to deal with. At the same time, the choice of sex development as an example serves to bring sex into the general framework of personality development and emphasizes that it is not the sole basis of such development.

This new concept of himself, in which his own values begin to predominate, must take on flesh and blood. As indicated in an earlier section, he, as an "I" of such-and-such values and beliefs, must repossess, take over, his body functioning from his previous self-concept. He must "work through" his former beliefs and values, lest these conflict with his present concepts and he become divided.

With the acquisition of his own capacity for metabolizing experience, there is the possibility for further independent growth. This growth, as already indicated, is different from previous nonphysical growth in that it is self-directed. The individual is therefore truly on the road to realization of his own potentialities as a human being.

The difference between Stage II and Stage III can be further seen in two important aspects of life, in individual and group relationships. In Stage II the closeness of the relationship between the individual and another person is due to lack of differentiation, with resulting dependence. In Stage III, as a result of differentiation of self from others, relationships are characterized by voluntary dependence of equal though different participants.

Attempt to Correlate Some Psychiatric Conditions with Their Origin in Stages of Self-Concept Development

Stage I	Stage II
Affect hunger (hospitalism)	Immaturity
Psychopathic personality	Neurosis
Shy or aggressive nursery child	Nail biting
Enuresis (?) (not all types)	Tics
Stuttering (?) (not all types)	

What goes on in the relationship is also quite different. The individual of Stage II will resist being influenced by the partner to the relationship at the same time that he seeks confirmation and approval. This is clearly seen in the negativism of children and the rebelliousness of adolescents. (It is exaggerated if there is accompanying neurotic development.) In Stage III there is no fear of being influenced by anybody any more than an individual would be afraid that his tissues would resemble the food that he takes in. Outside experience, like food, will be assimilated according to his own nature and by his own metabolic processes. The need for confirmation will also not be as intense as in Stage II, and will be different in quality, a phenomenon which cannot be discussed in this paper.

What holds true for single relationships will also hold for group relationships. Joining a group can be primarily for confirmation and approval, essentially a safety measure, or it can be for further growth and development.

II

In this section of the paper an attempt will be made to establish a relationship between the stages in the development of the self-concept and the origin of some clinical psychiatric problems (Table).

Since it is postulated that Stage I deals with the process of self-discovery leading to the first concept of "I," it would seem reasonable to attempt an interpretation of some of the psychiatric conditions arising in early childhood as deviations of this process. The essential factors we are dealing with in the first stage are an organizing

personality in process of formation and the human environment in which it is forming. To what extent does the human configuration influence this first concept of "I"? Some answer to this question may be ventured in a consideration of such syndromes as affect hunger (or hospitalism) and psychopathic personality, as well as certain features encountered in children with shy or aggressive behavior.

Affect hunger has been described for very early infancy, later infancy, and early childhood. This syndrome in early infancy has been dealt with by Ribble,[3] and in later infancy by Spitz (hospitalism).[4] Levy[5] and Lowrey[6] were the first to see the connection between inadequate close human contact in early life and abnormal behavior later in childhood in the case of institutionalized children sent for adoption or foster-home care. Similar studies on a more comprehensive scale were subsequently carried out by Goldfarb.[7]

If human contact in the first months of life is minimal, an infant may become apathetic, lose interest in feeding, grow sickly, and even die. Along the same line of experience is the old observation that infants did not do well in the impersonal atmosphere of a hospital.

In the case of older infants and very young children separated temporarily from their parents, as during evacuations in war time, there may be similar apathy, refusal to eat, changes in toliet habits, nightmares, and extreme unhappiness.[8]

Perhaps more revealing, however, and more germane to the main thesis are the studies on children institutionalized in orphan asylums from early infancy. It was found that these children, despite excellent physical and hygienic care, tended to develop into passive personalities, with emotional impoverishment, mental and social retardation, poor conceptualizing ability, and serious behavior difficulties. Children who had spent their first three years in an institution, when compared with a similar group of children who had been boarded out with families from early infancy, showed psychological and social immaturity in spite of subsequent transfer to foster homes.[7]

There is, therefore, the indication that when human stimulation is inadequate in quantity during Stage I, the urge toward self-discovery as an entity, the conceptualizing of oneself as "I," may be seriously interfered with or may not unfold at all. It is as if bodily functioning is not integrated into a meaningful and purposeful pattern and hence "peters out" when the urge and form are not supplied from the environment. It is apparent that a positive factor, as against the mere absence of negative factors, is necessary for a child's human growth.

A similar formulation of failure of the first concept of "I" to be whole and to include affective responsiveness to other human beings has been made for the

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3. Ribble, M.: The Rights of Infants: Early Psychological Needs and Their Satisfaction, New York, Columbia University Press, 1943.

4. Spitz, R. A.: Hospitalism, in the Psychoanalytic Study of the Child, edited by O. Fenichel and others, New York, International Universities Press, Inc., 1945, p. 53.

5. Levy, D. M.: Primary Affect Hunger, Am. J. Psychiat. **94**:643, 1937.

6. Lowrey, L. G.: Personality Distortion and Early Institutional Care, Am. J. Orthopsychiat. **10**:576, 1940.

7. Goldfarb, W.: Infant Rearing and Problem Behavior, Am. J. Orthopsychiat. **13**:249, 1943; Effects of Psychological Deprivation in Infancy and Subsequent Stimulation, Am. J. Psychiat. **102**:18, 1945.

8. Freud, A., and Burlingham, D. T.: War and Children, New York, Medical War Books, 1943.

syndrome usually called constitutional psychopathic personality. This syndrome is a repetitive pattern of behavior, asocial in character, accompanied by little or no manifest anxiety, and pursued without profit to the individual or to anybody else. Its early expression is in delinquent behavior, later, in alcoholism and crime. In these children there is evidence that early human contact was deficient, or frequently broken, and not continuous with the same adults during the first two or three years of life.[9]

One also encounters a behavioral problem in children in whom excessive shyness or aggressiveness have been present since their earliest associations with other children. The difficulties these children have with others of the same age becomes especially clear if they attended a nursery school at 3 or 4 years of age. When one investigates their home environments one often finds a family situation which seems to be satisfactory, but further inquiry usually reveals serious defects in it. One mother, for example, openly said she hated her child; another had been suffering from serious repetitive depressions; another had gone back to work when her child was 9 months old, although the family income did not demand that she do so. In this instance, also, one may predicate that the child's earliest dealings with his parents have left him feeling inadequate in his relations with other human beings. He reacts by avoiding contact with other children or acts out his distrust of them. This interpretation is not meant to exclude the operation of other factors which contribute to the difficulties of these children. In contrast to the more-or-less permanent psychological deforming that takes place in the case of affect hunger and psychopathic personality, the subsequent growth of these children may follow the neurotic pattern as discussed under Stage II.[10]

Arising also in this stage are a group of clinical conditions which include enuresis and stuttering. Enuresis is, of course, a symptom and may be associated with a variety of psychologic difficulties. It is mentioned here to suggest the possibility that, because of undue emphasis on bladder functioning for any reason, the functioning itself may be excluded from the self-concept. This may perhaps explain why in the enuretic child the bladder functioning during sleep seems almost separate from the rest of him.

Stuttering also begins in Stage I. It may be profitable, therefore, to consider certain aspects of it which some students of the condition have recently stressed.[11] It is the view of these investigators that early, undue emphasis on a child's normal speech repetitions makes him self-conscious and anxious about his speech. A vicious circle is set going which results in the clinical picture of stuttering. In the light of the present theory regarding the child's concept of himself, it is postulated that criticism and correction of his early faltering speech have had the effect of his speech not being fully accepted as part of himself to be developed unconsciously into a

9. Bender, L.: Psychopathic Behavior Disorders in Children, in Handbook of Correctional Psychology, edited by R. M. Lindner and R. V. Seliger, New York, Philosophical Library, Inc., 1947, p. 360.

10. Van Ophuijsen, J. H.: Primary Conduct Disturbances, in Modern Trends in Child Psychiatry, edited by N. D. C. Lewis and B. L. Pacella, New York, International Universities Press, Inc., 1945, p. 35.

11. Johnson, W.: People in Quandaries: The Semantics of Personal Adjustment, New York, Harper & Brothers, 1946, Chap. 17. Brown, S. F.: Advising Parents of Early Stutterers, Pediatrics **4**:170, 1949.

smooth, automatic function. It is often amazing that stuttering may almost completely disappear in any one child in the presence of some persons and in some situations and become very marked with other persons and in other situations. Stuttering is more reactive to the outside than normal speech. These considerations obviously do not cover all aspects of as complex a problem as stuttering.

In summarizing, then, the difficulties arising in Stage I, it may be said that their character partakes of the child's concept of himself as it has been molded by his earliest experiences with other human beings. There may be a deficiency in response to human relationships and human interests. His functionings as a human being may not be accompanied by good feeling and may not have been taken fully into himself. He acts out his difficulties.

The difficulties that arise in Stage II are of a different nature. When a child enters Stage II, provided his previous development has been moderately healthy, he will have discovered himself as an entity and he will be responsive to other human beings. As a result, self-concept will depend on the significant people about him, altogether in the beginning and less so as he grows older. The crucial question about the nature of this self-concept is whether, as he is, the child feels himself a match to meet his world as it keeps unfolding before him. The answer will depend on whether his parents have so treated him that he can be a match for the world that they constitute. If he can, he will begin a process of active experiencing, to feel his growing powers, to develop his potentialities, and to establish his own values. He will dare to become the self that he is growing into. He matures. On the other hand, if in the concept of himself as reflected from the significant persons about him he does not feel himself a match for his unfolding world, much of the child's energies will go into securing safety. He will develop psychological defenses to secure this safety, but at bottom he will remain feeling unsafe. Furthermore, his maturity will be seriously hampered. Instead of healthy growth, there will be abnormal, distorted growth, often labeled immaturity, with accompanying neurosis. Immaturity and neurosis are therefore the products of Stage II and include such symptoms as nail-biting and tics.

The trauma leading to distorted growth in Stage II is essentially of such a nature as to push the individual in the direction of having to be someone other than he is. That is the common element in the stumbling blocks frequently considered to be in the way of the growing child, whether they be rejection, overprotection, deprivation, vicious comparisons, possessive love, oversolicitousness, exploitation, restriction, male or female preference, overt or implied demands, favoritism, and so on. Whatever the predominant coloring of the trauma, the net result in the child is probably the same. To meet the world as he is is dangerous and threatening. He cannot simply be himself to react the way he feels and to grow at his own rate and rhythm. His spontaneity is not merely limited as it is in normal relationships, in which there must be consideration of the needs of others, or in situations in which real limitations, difficulties, and dangers exist. He cannot be himself in any relationship because as himself he is not good enough. This comes to him not only by direct communication but indirectly by all the forces pushing him to be somebody he is not. There begins to develop in him an uneasiness, a gnawing feeling, lest he be what he really is and thus incur disapproval and lose the affection he needs so badly. The first alternative to gain affection and feel secure is to be somebody else. How

deliberate this change can be in a child is illustrated in the famous case of Miss Beauchamp whom Morton Prince described in his book, "The Dissociation of a Personality." She idealized her mother who gave her little attention.

> Believing that the fault was her own and that her mother's lack of affection was due to her own imperfections, she gave herself up to imperfections and concluded that if she could only purify herself and make herself worthy, her mother's affection would be given her. She gave no expression to the ordinary feelings of everyday child life; never spoke to say she was tired, hungry or sleepy. She lived within herself and dreamed.

That is, she could not be herself.

This gnawing, inner feeling, fear of being oneself, becomes an important factor in the child's subsequent development. It is an over-all uneasiness, part of which can be understood as a normal accompaniment of an organism's expanding without fully knowing what awaits it; but here it is excessive in amount. While there may be some "acting out" in the beginning in response to his anxiety, the general and ultimate solution he develops is a psychological one.

An attempt will be made at this point to indicate the nature of the psychological response to the anxiety developing in Stage II, though it is not the object of this paper to discuss neurosis as such. The formulation that follows is essentially that of Horney.[12]

The child may try to solve his problem by moving closer to the more powerful member of the family. He clings, becomes eager to please. His real need for affection, his capacity to share feelings with others and to fit in his likes with those of others because they coincide, gives way to a compulsive need to please others and to subordinate himself. His guiding principle is his helplessness. Or, he may have tried to move closer and found that it failed to give him the sense of safety that he needed; he becomes suspicious and hostile and ready to fight everyone and everything, no matter what. He marshals his capacities not for his own growth and development but compulsively to fight the world. His guiding principle is that a hostile world, indiscriminately, is facing him. Or he may have decided to have done with the world. After trying pleasing and fighting, he may have found that his safety lay in neither but rather in avoiding emotional involvement with people. His capacity to be by himself and work by himself becomes a compulsive need to keep to himself and away from others, and this now becomes his guiding principle.

All three possible attitudes arise in the one child and all three are compulsive because behind each of them is anxiety and necessity. They are the accentuations and exaggerations of normal attitudes which the child would ordinarily use to grow and gain strength. They would normally be flexible, and their several uses would be guided by the situation and preference of the child and adult. They would be tools, means. But when behind them is anxiety they begin themselves to take on the character of ends, of solutions.

These first solutions are of course not adopted deliberately or all in one piece. They are hammered out by the vicissitudes of the daily living and the vagaries of the particular situation in which the child finds himself. They are the resultant of the various attempts which the child makes to most satisfactorily hold down his anxiety. Sometimes this process can be clearly seen when events follow one another

12. Horney, K.: Our Inner Conflicts: A Constructive Theory of Neurosis, New York, W. W. Norton & Company, Inc., 1945; Neurosis and Human Growth: The Struggle Toward Self-Realization, W. W. Norton & Company, Inc., 1950.

in a short space of time. A 3½-year-old girl reacted to a domineering, perfectionistic, hostile, and troubled mother, first by insisting on carrying her baby sibling in her arms and dropping him regularly, later by going on a hunger strike against all solid food and losing considerable weight, and finally by insisting on sleeping in the same room with her parents. What remained on the surface, at least for the time, was a clinging to the mother, that is, a solution of helplessness.

Different solutions may, then, be tried by the same child, and different solutions even toward different members of the family and outside the family. The child is thus compulsively driven in different directions. He is in conflict and at the mercy of a new source of anxiety. The child tries to solve this conflict and achieve a sense of unity by making one attitude predominant and submerging the other two. But this adoption of one solution does not make the others less compulsive. He must hold on to the solution he has made dominant only more strongly and "sit tighter" on the conflicting ones in order to give him a semblance of the unity he seeks.

Furthermore, not only are these three moves—toward, against, and away from people—conflicting in relation to others, but they set up contrary currents in his own personality which involve his needs, give rise to sensitivities and inhibitions, and determine the attitudes toward himself and his set of values. Moreover, they lead to still other anxieties. If the child's main solution for his problem is that of pleasing, gaining affection, and subordination to the wishes of others, he must put a damper on his own wishes, initiative, and striving. As this solution continues to develop in the older individual, his attitude toward himself grows in the direction of weakness, helplessness, measuring himself according to the opinions of others, and loss of self-confidence. He feels that his salvation is in the direction of love. There is a similar process with the solution of moving against people. His need to exploit, excel, and be hard and tough excludes the possibility of feelings entering his life, feelings for himself, for friends, or for disinterested enjoyment. He would then only be a "sucker," a "softie." It would be a defeat for his way of life. This happens also in the case of the solution away from people. As he grows older he tends to restrict his feelings, wishes, desires, and expansions for the sake of self-sufficiency and independence from people and for avoiding emotional intrusion into his inner life. He becomes hypersensitive to any form of coercion. He shies away from competition and the friction with people and things necessary for healthy growth, and therefore becomes more and more unable to fight against or work with others.

This brief and incomplete description of the pathogenesis of neurosis has been included at this point to indicate the nature of the reaction that takes place. The point that is meant to be stressed is that no matter how intricate the psychological structure which may be developed, at bottom there is immaturity in that the real potentialities of the individual have been hindered from developing. In addition there is conflict, anxiety, and alienation from his feelings.

Among the symptoms of anxiety which are common in childhood are nail biting and tics. Nail biting usually does not begin until the fith year of life and may last a lifetime, though it may be controlled for external reasons, such as aesthetic considerations.[13] Tics also usually begin at about 6 years of age.[14] Both nail biting and tics

13. Kanner, L.: Child Psychiatry, Springfield, Ill., Charles C Thomas, Publisher, 1948, p. 537.

14. Kanner,[13] p. 413.

are expressive of anxiety and become intense when the anxiety is intense. Although enuresis and stuttering are influenced by anxiety, the anxiety seen in the case of these phenomena is often secondary.

The foregoing formulation of neurosis also indicates that immaturity does not take place as a result of simple restriction. It is the nature of an organism to grow, and when it does not do so in a healthy direction, it will do so in an abnormal direction. In the case of altered human growth, neurosis makes its appearance.

To summarize this section of the paper, it is believed that some correlation can be made between certain psychiatric syndromes and the stages of the concept of self previously outlined, both as regards the time of occurrence and the forces operating. There is the possibility that with more data the relationship could be drawn more accurately and might be extended to include other clinical entities.

III

Several general principles which have a bearing on mental hygiene may now be drawn from this sketch of the development of the self-concept. These principles are not new, but their relation to the predominant psychological forces operating in each stage of development can be shown more clearly and more specifically.

From Stage I the important conclusion to be drawn for mental health is that there is no being human without human beings. Being born of human beings does not automatically make human beings of us. Furthermore, this dependence for becoming human on other human beings does not refer to human beings in the abstract or to some vague concept of humanity, either scientific or religious, but to human beings who are present with their bodies and their feelings. Only in that way is the feeling of being human communicated to the infant and the child.

It is because of the crucial importance of the early communication between mother and child that so much stress has been laid on whether the infant was "wanted." Real wanting must, however, be separated from a behavioral wanting, such as wanting to have a child because "it's the thing to do," or to "cement" a marriage which is otherwise unsatisfactory, or to show that one is "normal," and so on. Really wanting a child, on the other hand, comes from the mature growth of the parents, and, as one aspect of their potentialities, includes the desire to realize their capacity to be productive. It would be linked to a love for themselves to want to produce another human being in their own image. Only if they love themselves, can they really love anyone else.[15] Only if they can get close to themselves, can they get close to someone like themselves.

Since the vital business between infant and parent is communication which is adequate in quality and quantity, certain pediatric practices may be examined from this point of view. The following remarks refer to breast feeding particularly, but, to the extent that similar factors are involved, these considerations would hold for self-demand feeding and rooming-in nursery care.

In the case of breast feeding, what is important is the psychological motivation of the mother who decides for or against breast feeding A mother who is out to prove herself a perfect mother does not necessarily have more warmth for the child because she breast feeds it than a mother who for economic reasons decides not to do so. On

15. Fromm, E.: Man for Himself: An Enquiry into the Psychology of Ethics, New York, Rinehart & Co., Inc., 1947, p. 119.

the other hand, a mother who rejects breast feeding may do so because she cannot make a real commitment to the child—"I'm not a cow"—an attitude which will come out in other relations with the child. What is communicated to the child, it would seem, would depend less on the mechanics of the feeding than on the inner motivations of the person who is doing the feeding.

In Stage II, since the essential task of the child is to become aware of and take possession of his own powers, it becomes crucial that his experiencing should more and more be of an active kind instead of a passive kind. That is, he should himself come into active contact with the stuff that constitutes life, namely, himself, other people, things, activity, and situations. What is meant by active experiencing can be illustrated by a simple example, bringing an erector® set to a child.

From the moment the package is in his hands, he feels free to do what he wants with it. He opens it, speculates on what it is, recognizes what it is, expresses happiness or disappointment, notices the arrangement of the contents, finds a book of directions, feels the touch of the steel, the difference weights of the parts, and their number, and so on. He does all this before he has attempted to do a thing with the set. Then comes the thrill of doing something with it. It may be only matching one single part with another. Thereby alone he gets a feeling of having done something, that he can do something, and that he is not helpless with that particular article. Whatever pattern is subsequently followed, whether his interest extends to the full utilization of the set and therefore toward further gaining a feeling of greater and greater accomplishment, or whether he completely discards it, his initial contact with the erector® set has been meaningful.

The results of active experiencing can be summarized approximately in the following way. There is physical, emotional, and intellectual self-involvement; there is a recognition and further exploration of one's abilities; there is initiation of activity or creativeness; there is finding out one's own pace and rhythm and the assumption of enough of a task for one's abilities at that particular time, which would include the avoidance of taking on too much; there is gain in skill which one can apply to other enterprises, and there is an opportunity each time that one has an active part in something, no matter how small, to find out more and more what one is interested in.

The above situation may be contrasted with another in which the person who brings home the erector® set says to the child, "Here is an erector® set, let me open it for you." He does so, and then he points out all the things in the box, the book of directions, the various parts, etc., and, to top it off, he sets about building one of the complicated models, let us say, a crane. The child may be much interested in what he has seen being done, but let us focus on one aspect of what has really been happening. The child has had no opportunity to get himself involved with the erector® set, with his body, his intelligence, or his feelings, he has had no opportunity to match himself up with something that is new for him, to find out what he is capable of or to gain further direction for his interests. The building of the crane for him may have brought in another factor. It may have left the child with an implied demand that he do likewise without his having had an opportunity to prepare himself for any such complicated task. The end becomes the objective instead of the experience involved in the process of attaining the objective. Also, whatever he may subsequently do by himself will look small and mean compared to what had been made for him by someone else. He has not added to his total experience

for coming up against something new the next time. In other words, he has not grown from within but has had something superimposed from the outside.

A modest example has been given, in this coming together of a child and an erector® set, but the same principles hold for any other situation that may confront a child, be it digging a hole, meeting friends, going to school, choosing a profession, or getting engaged. Each bit of active experiencing is an opportunity toward finding out what he likes or dislikes, and more and more what he wants to make out of himself. It is an essential part of his progress toward the stage of maturity and self-direction. The usefulness of this general principle was recently demonstrated by Schwartz and his co-workers [16] in the treatment of children with cerebral palsy when the "traditional methods of passive physical therapy" were not "productive."

There is, of course, a place for passive experiencing. Much of the child's early experiencing is passive, e. g., being fed. An analogy between active and passive experiencing can be made in terms of active and passive immunity. (A similar analogy has been drawn by Rosenzweig [17] for the acquisition of what he calls "frustration tolerance.") Passive immunity plays a vital role in the life of the child, particularly at certain times, but it is temporary and does not prepare the child for future encounters with similar infectious agents. When resorted to, its objective is circumscribed, to be succeeded by efforts to encourage development of an active immunity when and if possible. Similarly with passive experiencing, the objective is to make possible the subsequent taking over by the child of his own active experiencing. With each child there would have to be a nice judgment as to what would be for him too little, too much, or just enough active experiencing to foster further growth. But where there is no active experiencing, there can be no development toward self-direction and self-realization.

To permit and encourage active experiencing by the child would require of the parents certain qualities of mental health. The world would not be unrealistically dangerous and threatening for them, and they therefore would not make it so for him (through "germs," accidents, occult forces—"bogey man"—or through other human beings). They would do their own growing, their own active experiencing, and they therefore would have no desire to do it for the child or the child for them. They would not have to satisfy perfectionistic trends in themselves through the child, or have the esteem of themselves rise or fall with what he does or how well he does it. They would not have to fulfill through him what they have not been able to fulfill through themselves, be it the attainment of security or of position. In other words, the pleasure they get from the child comes from the child's own fulfillment and not from the uses to which he can be put.

SUMMARY

The concept of self of an individual is described as undergoing three stages of development: (1) discovery of self, which is dependent on adequate qualitative and quantitative communication with other human beings; (2) possession of self, which

16. Schwartz, R. P.; Zuck, F. N.; Parsons, F. H.; Wingate, K.; Lacey, T., II, and Johnson, M. K.: Motivation of Children with Multiple Functional Disabilities, J. A. M. A. **145**:951 (March 31) 1951.

17. Rosenzweig, S.: A Dynamic Interpretation of Psychotherapy Oriented Towards Research, Psychiatry **1**:521, 1938.

is possible only when the individual's value of himself, as reflected from the significant persons about him, is a positive one and allows active experiencing of himself and the world, and (3) direction of self, when as a consequence of previous healthy development the individual can assume direction for his own growth as a person.

Altered development in the first two stages is thought to result in specific psychologic clinical entities which are interpreted in the light of the present theory. An attempt is also made to correlate some principles of mental health with the stages of self-concept development.

40 W. 55th St. (19).

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DIRECT-WRITING HEART-SOUND RECORDER

(The Sonvelograph)

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SEATTLE

THE USE of modern recording devices to supplement subjective impressions with objective determinations constitutes an important aspect of current progress in clinical diagnosis. For example, many types of cardiac arrhythmia may be recognized from clinical signs, but electrocardiography has become the final court of appeals in most cases. Similarly, the size and configuration of the cardiac silhouette can be determined more accurately from teleroentgenograms than by percussion. It is generally recognized that an objective record, examined visually, is more reliable than subjective sensations, such as tactile, temperature, or auditory perception. In view of the limitations of auditory acuity and the difficulty in distinguishing the temporal sequence of sounds, stethocardiography represents another opportunity to supplement subjective sensations with objective records. Sensitive and reliable stethocardiographs have been available for many years, but their use has been very limited. The advent of direct-writing electrocardiographic equipment, using high-inertia, low-frequency galvanometers, presages further reduction in the availability of this valuable tool unless methods are developed for reliably recording heart sounds with this type of equipment. One approach to this problem is the direct inscription of an intensity envelope which represents a continuous record of sound intensity, regardless of frequency. Such records can be readily inscribed by galvanometers with a linear response to frequencies from 0 to 80 cps, even though heart noises include frequencies of 600 cps or more.[1]

The basic requirements of a phonocardiograph are summarized by Orias and Braun-Menendez [2] as follows: (*a*) It shall be of high sensitivity with the lowest possible threshold of intensity and frequency, in order to respond to the whole range of vibrations produced by the heart. (*b*) The deflections of the recording unit shall be directly proportional to the forces acting upon it. (*c*) Its natural frequency shall be high enough to not distort the record of the vibrations. (*d*) It shall be of minimal inertia. (*e*) It shall be fully damped. (*f*) It should be possible to obtain simultaneously other records of cardiac activity. By recording only the amplitude of heart sounds and murmurs, regardless of frequency, the requirements listed under *c*, *d*, and *e* are rendered less exacting.

From the Department of Physiology and Biophysics, University of Washington School of Medicine.

1. Williams, H. B., and Dodge, H. F.: Analysis of Heart Sounds, Arch. Int. Med. **38**:685-693 (Dec.) 1926.

2. Orias, O., and Braun-Menendez, E., The Heart Sounds in Normal and Pathological Conditions, New York, Oxford University Press, 1939.

APPARATUS

A direct-writing four-channnel polygraph has been designed and constructed for laboratory and clinical testing. Four pen writers, having a linear response to frequencies up to 80 cps, simultaneously inscribed records of (1) electrocardiogram, lead II, (2) venous pulse, arterial

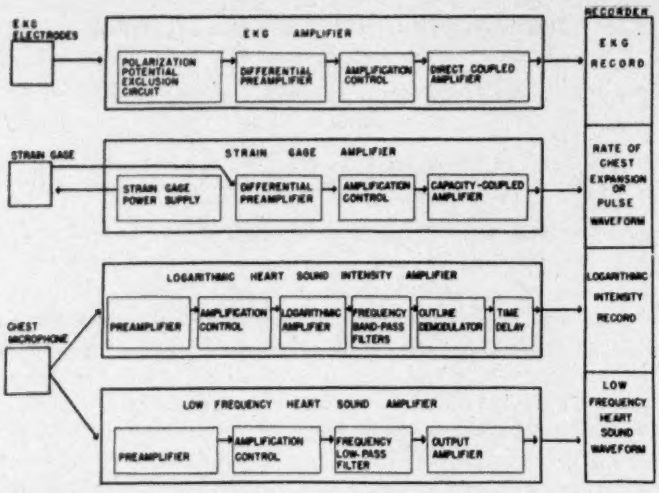

Fig. 1.—Block diagram indicating the components of the amplifier and control systems in the four-channnel polygraph for recording and timing heart sounds.

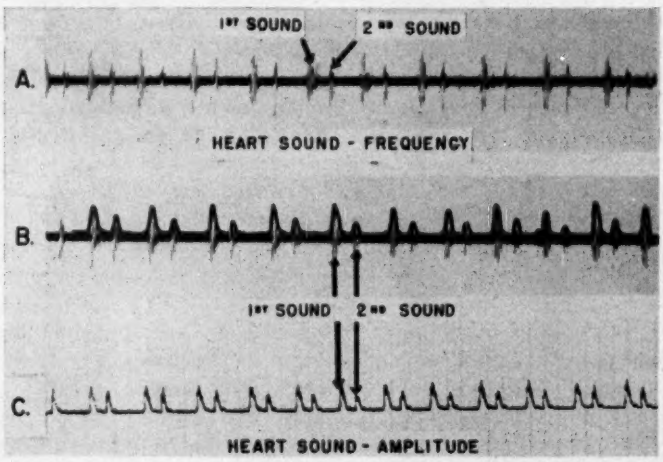

Fig. 2.—Derivation of a heart-sound intensity envelope from the recorded heart sounds; (*A*) stethogram recorded by means of a high-frequency Hathaway galvanometer; (*B*) sound "envelope" produced by connecting the peaks of each vibration; (*C*) heart-sound envelope from the same subject recorded directly.

pulse, or respiratory movements, (3) the logarithm of the sound-intensity envelope, and (4) a linear record of sounds with frequencies between 5 and 40 cps. The components of the apparatus are illustrated by a block diagram in Figure 1. During the studies covered by this report, a

Maico heart-beat microphone (Model 5306) was used to pick up the heart sounds. Standard circuits were used for electrocardiographic recording and for the Statham unbonded strain gauge-pressure transducers, which respond to vascular pulses or to respiratory movements, and therefore no further description is warranted.

The derivation of the heart-sound-intensity envelope is indicated in Figure 2. The upper record represents the familiar type of stethogram recorded by means of a Hathaway oscillograph, employing a galvanometer which responds uniformly to frequencies from 0 to more than 2,000 cps. Such a record indicates both the frequency and the amplitude of those sounds which have

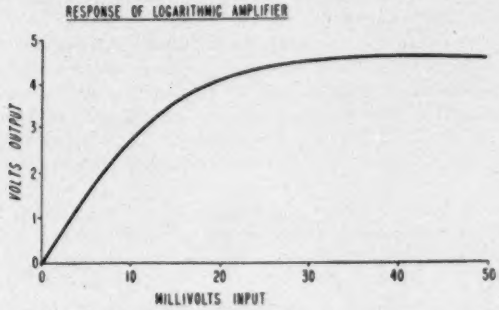

Fig. 3.—Graph revealing the extent to which the amplifier response is directly proportional to the logarithm of the input signal. The shape of the curve applies to all frequencies, but the scale varies in terms of the frequency response curves in Figure 4.

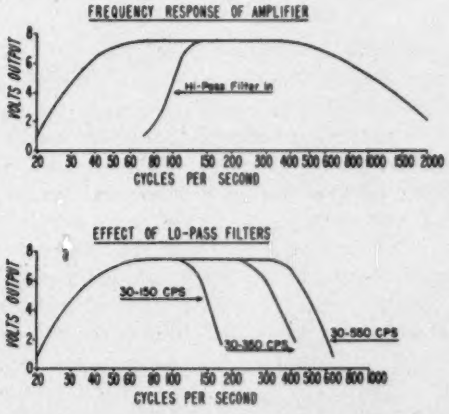
FREQUENCY RESPONSE OF AMPLIFIER
VOLTS OUTPUT
Hi-Pass Filter In
20 30 40 50 60 80 100 150 200 300 400 500 600 800 1000 1500 2000
CYCLES PER SECOND
EFFECT OF LO-PASS FILTERS
VOLTS OUTPUT
30-150 CPS
30-350 CPS
30-550 CPS
20 30 40 50 60 80 100 150 200 300 400 500 600 800 1000
CYCLES PER SECOND

Fig. 4.—Upper graph, over-all frequency response of the amplifier. The response is approximately uniform from about 60 to 600 cps., but due to the logarithmic characteristics of the amplifier, the effective range is considerably extended (to about 30 to 2,000 cps). The high-pass filter attenuates sounds below 100 cps to emphasize high-frequency, low-intensity sounds. Lower graph, low-pass filters selectively attenuate sounds above 550 cps, above 350 cps, and above 150 cps to indicate the frequencies contributing to the recorded sonvelograms.

sufficient intensity to produce deflection of the galvanometer. If the peaks of each successive wave are connected by a continuous line, an "envelope" of sound intensity is inscribed (Fig. 2*B*). This process can be duplicated electronically by employing a resistance-capacitance time constant of 0.03 seconds in the amplifier, so that the pen fails to return to the base line between the peaks of the individual spikes (Fig. 2*C*). Since the amplitude of the spikes is proportional to the

intensity of the sound, the intensity envelope represents a continuous record of sound intensity. For convenience, this type of record has been termed a sonvelogram (Latin *sonor*, noise—*velare*, to envelope).

The second stage of amplification (Fig. 1) has a logarithmic response to the signal, i. e., the amplitude of the deflection is proportional to the logarithm of the sound intensity (Fig. 3). This greatly extends the range of sound intensities to which the apparatus will respond, and in this respect it resembles the human auditory mechanism. However, unlike the human auditory response, the amplifier has the same logarithmic response to all frequencies within its range. The response of the amplifier is linear between 60 and 600 cps (Fig. 4, upper graph). Since the logarithmic characteristics of the amplifier accentuate weaker signals, the total effective frequency range is extended beyond 30 to 2,000 cps.

Since the intensity envelope fails to indicate the frequency components of the sounds, a series of filters has been included to determine the frequency range of the vibrations contributing to the envelope. By adjusting a multiple switch, the high frequencies can be progressively eliminated by low-pass filters. The inclusive ranges are approximately as follows: 30 to 750 cps, 30 to 350 cps, and 30 to 150 cps (Fig. 4, lower graph). To emphasize low-intensity, high-frequency sounds, a high-pass filter which attenuates frequencies below 100 cps can be used. (Fig. 4, upper graph).

Since the human auditory mechanism is extremely insensitive to sounds having frequencies below 40 cps, a linear record was also obtained of the frequencies between 5 and 40 cps. These sounds are largely within the tactile rather than the auditory range of perception.

RESULTS

This equipment has been used to record the heart sounds in a large number of normal subjects and in more than 100 patients with congenital and acquired heart disease. A few samples are presented to indicate the nature of the records and their interpretation. The first series illustrates the recorded configuration of the various heart sounds (Fig. 5).

The first record (Fig. 5*A*) was obtained during voluntary cessation of breathing, as indicated by the pneumogram. On the sonvelogram, the first and second sounds are of similar amplitude. A small deflection consistently preceded the first sound, probably representing a relatively prominent "auricular" sound. The linear stethogram responds directly to the sound energy within a frequency range limited to 5 to 40 cps. It soon became apparent that the predominant vibrations in this frequency range were associated with the first and second heart sounds. In the mitral and tricuspid areas, there is usually a large deflection, which appears to have a constant relation to the second component of the first sound, and a smaller deflection which appears early in the second sound. The relative amplitude of these two deflections is reversed in the aortic and pulmonary areas. Another record, obtained during quiet breathing, showed slight distortions of deflections in the log-intensity envelope associated with respiratory activity (Fig. 5*B*). Violent respiratory activity may completely obscure the heart sounds. The amplification of the linear stethogram was greater than in the preceding record, but the deflections retained their relation to the first and second sounds in the sonvelogram.

The sonvelogram in the third record (Fig. 5*C*) reveals slight splitting of the first sound, marked splitting of the second sound, a prominent third heart sound, and a notched upswing of the first sound caused by the so-called auricular component of this sound. In Figure 5*D*, four heart sounds and a low-intensity, mid-systolic murmur are visible.

Alterations in the sonvelographic records, associated with various heart murmurs, are presented in Figure 6. In the first record (Fig. 6*A*), a loud systolic

murmur fills the interval between the first and second sounds. Certain low-frequency components appear in the linear stethogram, but the first and second heart sounds can still be distinguished.

The next record (Fig. 6*B*) reveals a soft systolic murmur occupying the period between the first and second sounds. It was recorded from the third intercostal

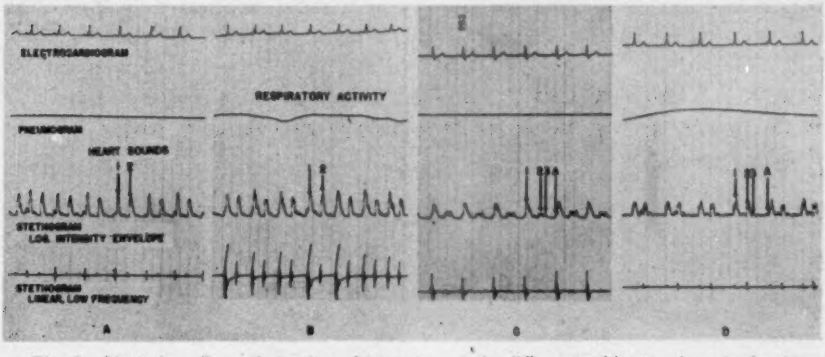

Fig. 5.—Variations in configuration of heart sounds in different subjects: *A*, normal subject with a prominent auricular sound. *B*, the same subject during normal respiratory activity; *C* and *D*, splitting and prolongation of the first and second sounds with prominent auricular and third heart sounds and soft systolic murmurs, from two different patients.

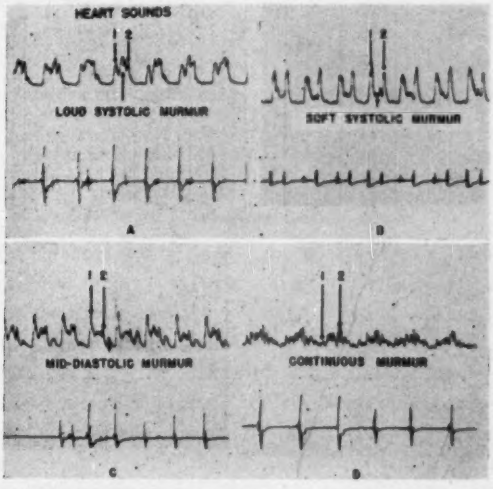

Fig. 6.—The heart-sound intensity envelope in the presence of murmurs: *A*, loud systolic murmur; *B*, soft systolic murmur; *C*, loud systolic and middiastolic murmur; *D*, continuous murmur (patent ductus arteriosus).

space at the parasternal line, where the second sound is slightly louder than the first in both the intensity envelope and the linear stethogram. A well-circumscribed middiastolic murmur, associated with a fairly loud systolic murmur, appears in Figure 6*C*. The continuous, machinery-like murmur from a patent ductus arteriosus appears in Figure 6*D*. The identification of the second sound is made easy by the

large spike in the linear stethogram. Identification of the faint first sound required reference to the electrocardiogram. Note that the deflections produced by this coarse murmur in the low frequency stethogram were insignificant compared to the deflection from the second sound.

The contribution of various frequency ranges to the heart sounds in a patient with a loud systolic murmur are revealed by a series of filters (Fig. 7). Both sounds and murmurs are composed largely of frequencies below 150 cps (Fig. 7*D*), but a considerable contribution appears in the range between 150 and 350 cps (Fig. 7*C*). This type of analysis has added little information beyond that available in the routine records, except for distinguishing two murmurs having different frequency components.

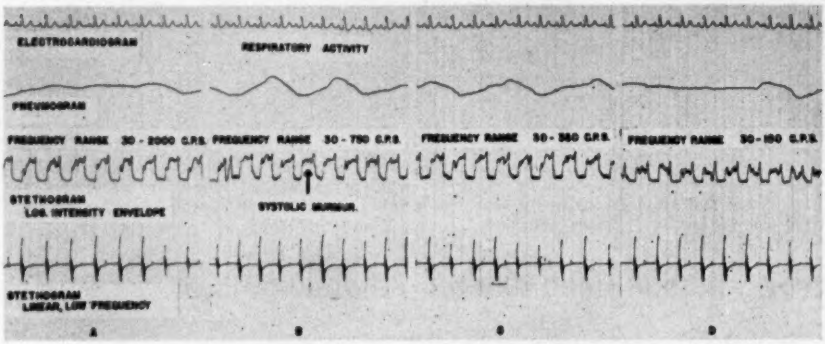

Fig. 7.—The frequency components of the sounds and murmurs indicated by means of various low-pass filters. Frequencies between 30 and 150 cps (*D*) produce deflections somewhat smaller than those including 30 to 350 cps (*C*), indicating that a considerable contribution is made by frequencies ranging between 150 and 350 cps. No significant contribution is made above 350 cps (*A* and *B*).

COMMENT

Recording the intensity envelope of sound is a reasonable approach to stethography, because the exact frequency of heart sounds and murmurs is rarely considered in interpreting these sounds. The patterns which are produced are much simpler in form, and, for this reason, they can be more readily compared. On the other hand, the elimination of frequency from the response represents a degradation of the original signal which might not be warranted except for use with the low-frequency-galvanometer systems in direct-writing electrocardiographic equipment. It might be pointed out that the standard electrocardiogram represents degradation of the three-dimensional orientation of the electrical vectors within the heart. However, it is not seriously proposed that electrocardiography be eliminated in favor of spatial vectorcardiography, partly because it is difficult to describe the complex loops produced by that method. Heart-sound intensity records represent a simplification of heart-sound records by the elimination of the high-frequency oscillations.

The effectiveness of the equipment can be assessed only by a comparison with other available methods under controlled conditions. The sonvelographic records from 245 school children compared favorably with recordings by qualified physicians

and a commercially available phonocardiograph, with respect to both identification and interpretation of heart murmurs. The results of this study are presented in another report.[3]

CONCLUSIONS

Heart-sound recording equipment has been constructed which is applicable to high-inertia direct-writing penmotors. This is accomplished by continuously recording an envelope of the sound intensity (sonvelogram). By means of an amplifier which responds to the logarithm of the sound intensity, a wide range of amplitude can be recorded. The response of the sonvelographic amplifier and recorder is linear for frequencies from 60 to 600 cps.

The record can be observed in its final form as it is inscribed, and the simple patterns facilitate comparison of the records.

Sonvelographic recording can be readily adapted to standard direct-writing electrocardiographic equipment.

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3. Rushmer, R. F., and others: Variability in Detection and Interpretation of Heart Murmurs in Children by Auscultation and Stethography, A. M. A. Am. J. Dis. Child., this issue, p. 740.

VARIABILITY IN DETECTION AND INTERPRETATION OF HEART MURMURS

A Comparison of Auscultation and Stethography

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PROMPT, accurate diagnosis of heart disease in children has become increasingly important with the advent of more effective therapeutic techniques. For example, corrective surgery holds promise of cure or alleviation of symptoms in a number of congenital malformations of the heart, and more specific therapy is now available for patients with acute rheumatic fever. The use of antibiotics to avoid recurrences of rheumatic fever may represent an even more important contribution, since prevention of disease processes is actually more valuable than treatment of active lesions. Selection of patients for preventative care presents serious problems, since it is neither practical nor desirable to prescribe extended courses of therapy indiscriminately to large masses of the population.

In most pediatric cases, preexisting cardiac disease is initially suspected on the basis of heart murmurs. However, a large proportion of children have murmurs, most of which must be classified as "functional." The murmurs associated with organic heart disease are generally recognized if the lesion is sufficiently well developed, but in a large number of children the condition falls into the category "possible organic heart disease" which lies between the functional and organic classifications. Complete history, physical examination, and laboratory tests may supply sufficient information to confirm or exclude organic heart disease. More frequently, case studies extending over a period of years are required to make the distinction, but even in these cases, a decision must be made concerning the advisability of instituting preventative measures. When all these methods have been exhausted, there remains a sizable group with heart murmurs of questionable significance. In the course of investigating the usefulness of a new type of direct-writing stethograph

This investigation was financed by a grant from the Washington State Department of Health.

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(the sonvelograph [1]), an experiment was undertaken which indicated a remarkable variability in detecting and in interpreting heart murmurs in a fairly large number of unselected and selected school children.

METHODS

In general, the plan of the experiment was to compare the auscultatory observations of three examiners and the stethographic records from two types of heart-sound recording devices. Those children who were suspected of having organic heart disease on the basis of heart sounds were returned for a more complete examination by six examiners, the two heart-sound recording devices, and ancillary laboratory tests.

Heart sounds were recorded simultaneously by two separate pieces of equipment. The output of a Sanborn logarithmic microphone was split and led into a Sanborn Stethocardiette [2] and into a special amplifier which integrated the heart sounds into a log intensity envelope (sonvelogram).[3] Portable sonvelographic recording equipment was developed for this study. Briefly, the sonvelogram is obtained by imposing a time delay of 0.03 seconds into the response of the amplifier, so that the pen fails to return to the baseline between sound waves and tends to follow the peaks of the individual waves. In this way, a continuous record of sound intensity is inscribed, independent of the frequency, ranging from 60 to 600 cps. Because the response of the amplifier and microphone is logarithmic, the apparatus, like the human ear, responds to a very wide range of sound intensities. A filter system selectively attenuates the low-frequency sounds to provide a frequency-response curve resembling that of human auditory perception. Initially, this filter system approximated the hearing curve at 20 db., but it was later adjusted to correspond to the hearing curve for 60 db.[4] because heart sounds at the thoracic wall are more intense in children than they are in adults. For this study, the logarithmic response of the amplifier was supplemented by a Sanborn logarithmic microphone to cover a very wide range of sound intensity.

The potentials developed at standard limb electrodes were fed into both the Stethocardiette and through a Sanborn electrocardiograph amplifier to the second channel of the Brush pen motor. The electrocardiograms appeared on each heart-sound record for timing purposes. As the microphone was moved to different areas on the precordium, the lead selector switch on the electrocardiogram amplifiers was adjusted, and in this way the three standard limb leads were recorded for each case.

Heart-sound records were obtained from four points on the precordium: at the fourth left intercostal space in the midclavicular line (position 1), at the parasternal line in the third left intercostal space (position 2), the second left intercostal space (position 3), and the second right intercostal space (position 4). The numbers which follow the case numbers on the illustrations identify the recording position in Figures 2, 3, and 4.

In the first three phases of the study, auscultation was performed by three examiners: a cardiologist (D. R. S.); a pediatrician who had participated in the heart disease screening program for grade school children in St. Louis in 1949 (R. F. L. P.), and a physician in the King County Health Department who also contributed data on Wetzel grid (E. E. B.). Each examiner, stationed in a separate room, filled out a form which included an identifying case number, a schematic drawing of the intensity and timing of the heart sounds and murmurs, notations concerning the quality of the sounds, and an indication that the murmurs were func-

1. Rushmer, R. F.; Bark, R. S., and Ellis, R. M.: Direct-Writing Heart-Sound Recorder (The Sonvelograph), A. M. A. Am. J. Dis. Child., this issue, p. 733.

2. Rappaport, M. B., and Sprague, H. B.: Physiologic and Physical Laws That Govern Auscultation and Their Clinical Application, Am. Heart J. **21**:257-318, 1941.

3. Rushmer, R. F.: Stethography of the Heart Sound Intensity Envelope, abstracted in Fed. Proc. **9**:111, 1950.

4. Committee on Acoustical Measurements and Terminology of the American Standards Association: Proposed Standards for Noise Measurement, J. Acoust. Soc. Am. **5-6**:109-111, 1933.

tional, possibly organic, or definitely organic. The graphic representation of the heart sounds was based on examination of the mitral, pulmonary, and aortic areas when the patient was supine, but additional information was sought by auscultation in other positions and after exercise. The location of murmurs heard in other than the standard auscultatory areas was indicated on a map of the thorax.

The heart-sound records were initially interpreted by an examiner (R. F. L. P.) who had no previous experience with stethographic techniques. When these records were reexamined independently by another member of the team, only minor additions or changes were required.

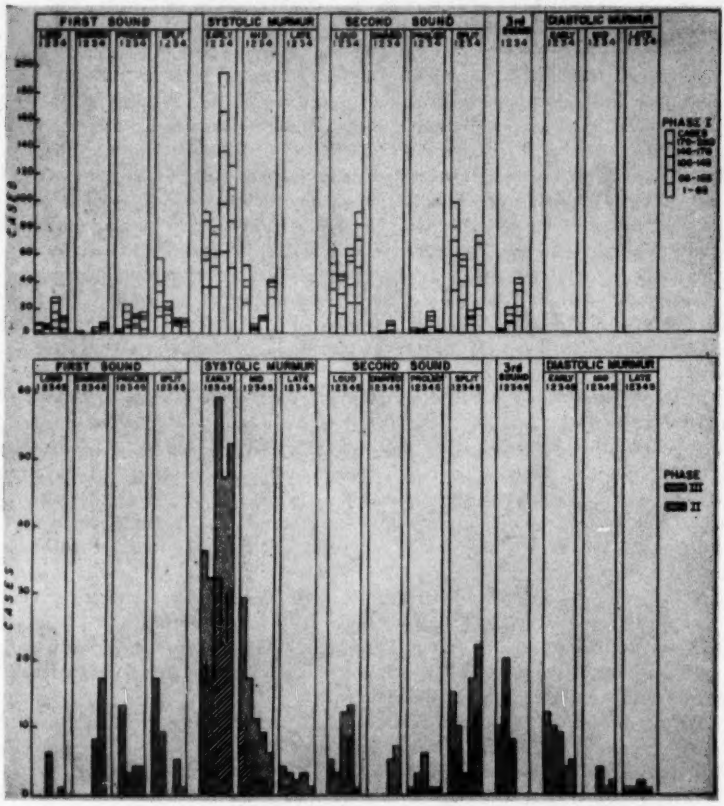

Fig. 1.—Upper, total incidence of various notations on (*1*) sonvelogram (*2*) stethocardiogram (*3*) examiner No. 1, and (*4*) examiner No. 2, in 211 unselected school children (Phase I); lower, total incidence of various notations on 34 children with "heart murmurs" noted on school records (Phase II) and on 32 patients attending cardiac clinics or hospitalized for heart disease (Phase III).

These consisted mainly of deciding whether a murmur was early systolic, midsystolic, or both, and the notation of a few third heart sounds.

Phase I of the study was conducted on 211 school children, ranging in age from 7 to 10 years, selected at random from the rolls of an elementary school. Complete examinations could be conducted on 40 children during a period of five hours. One examiner (E. E. B.) could not participate in the first three days of testing, so this incomplete series of records was eliminated from the tabulations in the first phase, but has been included in the illustrations of individual cases.

During the first 65 cases of Phase I, the sonvelographic equipment, previously tested under laboratory conditions, recorded sufficient adventitious noise to produce irregular undulations of the baseline, which made interpretation more time-consuming and less accurate. Although this difficulty was later overcome, the relatively poor early records were not eliminated from the data. In plotting the total incidence of various findings (Fig. 1), the cases studied in Phase I were arbitrarily divided into four groups to avoid obscuring significant changes in the performance of the equipment, in the interpretation of records, and in auscultatory reports as the study progressed.

In Phase II, the records of all the elementary schools in one district were scanned and 34 children whose records bore notations of heart murmurs were examined.

Phase III consisted of comparative stethographic and auscultative records from a group of 32 children and adults in cardiac clinics or wards, most of whom had definite organic heart disease.

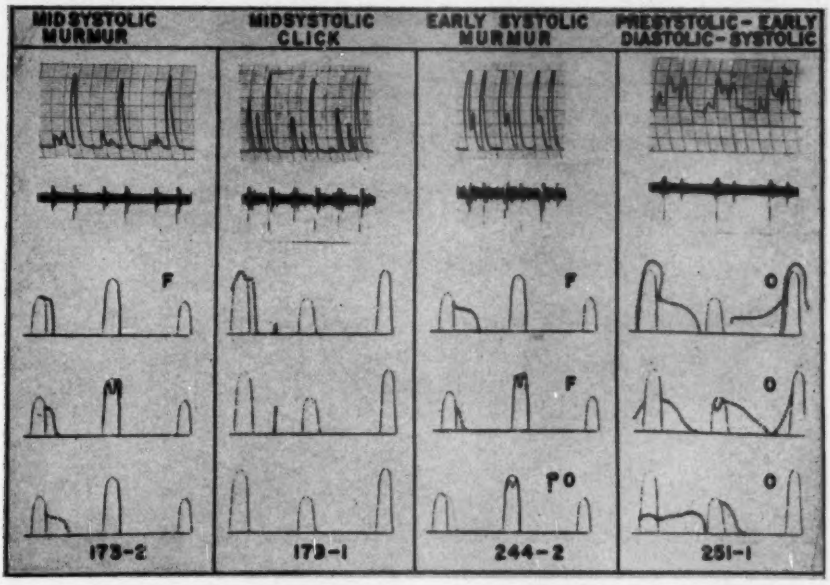

Fig. 2.—Sample records from Phases I, II, and III: Case 173-2, midsystolic murmur on stethograms, early systolic murmur noted on auscultation (pulmonary area); Case 179-1, midsystolic click noted on stethograms and by two of three examiners (mitral area); Case 244-2 (Phase II), early systolic murmur noted on all records; Case 251-1 (Phase III), presystolic murmur, systolic murmur, and early diastolic murmur in mitral area. Note the similarity of auscultatory findings in this last case, that of a child with well-developed organic heart disease.

Finally, one of us (R. F. R.), without reference to any other data, rapidly scanned the sonvelograms of the 245 cases in Phases I and II, selecting children for reexamination. Since it was impossible to distinguish third heart sounds from early diastolic murmurs on sonvelograms, children with large deflections recurring regularly in successive diastolic periods were classified as having "possible organic heart disease" and considered as candidates for reexamination. In addition, all systolic murmurs which had maximum intensity in the midsystolic or late systolic periods were similarly classified. This task was accomplished in one and three-fourths hours. The stethograms obtained from the Sanborn Stethocardiette were independently examined at another time for murmurs which would warrant additional study. Children noted as possibly having organic or definitely organic heart disease by any of the auscultators were automatically added to the group for a return visit. A total of 18 children were reexamined (Phase IV).

This reexamination included auscultation by six examiners, including the original team and three additional observers: the cardiologist at the University of Washington School of Medicine (R. R. B.), his associate (G. B. W.), and either a prominent local cardiologist (W. C. B.) or a member of the staff of Cardiac Clinics, Children's Orthopedic Hospital (R. F. R.). Heart-sound records were repeated using the same equipment as in previous studies, and the following additional information was obtained: history, pulse rate, complete electrocardiograms if indicated, blood pressure, sedimentation rate, antistreptolysin titer, and results of fluoroscopy by two examiners. Roentgenograms requested by the fluoroscopists were obtained in six cases. Sufficient data for interpretation of Wetzel grids was available on 180 of the unselected children in Phase I, and, of these, 46% had significant "growth failure" during the period for which records were available. The Wetzel grid is more effective if used as a basis for study during the period of growth failure, which may result from a multitude of causes.

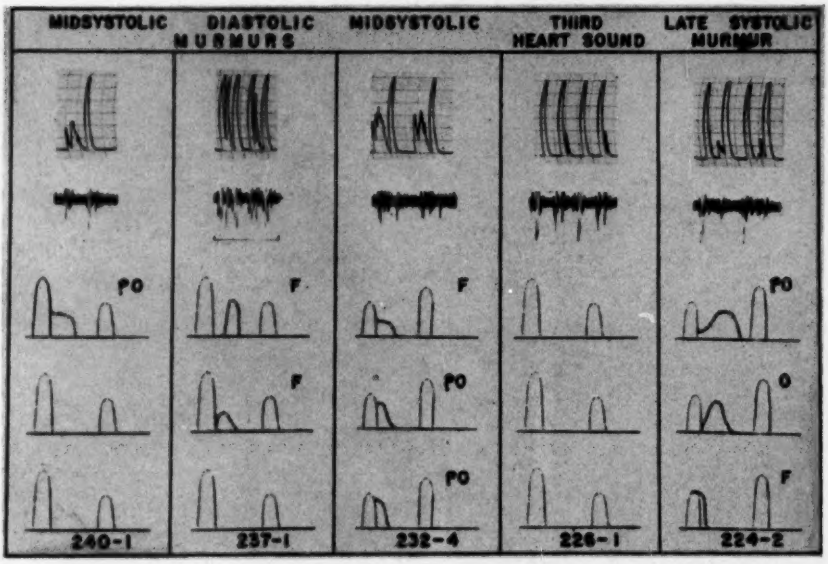

Fig. 3.—Sample records from Phase II: Case 240-1, midsystolic murmur on sonvelogram, early diastolic sound on stethocardiogram, and early systolic murmur noted by examiner No. 1; Case 237-1, loud early diastolic sound (murmur?) on both heart-sound recordings, indicated as systolic by auscultators; Case 232-4, loud systolic murmur (aortic area) indicated as midsystolic on both heart-sound records and early systolic by auscultators; Case 226-1, loud third heart sound on both heart-sound records not audible to the examiners; Case 224-2, late systolic murmur on heart-sound records, classed as midsystolic or early systolic murmur by examiners.

RESULTS

The incidence of various observations made on 211 unselected school children in Phase I of the study is indicated in Figure 1 (upper chart). The changes noted in the first and second heart sounds, the presence of a third heart sound, and systolic and diastolic murmurs are tabulated in columns headed by numbers which indicate the origin of the data: (1) sonvelograms, (2) Stethocardiette, (3) examiner 1 and (4) examiner 2. Loud, diminished, or prolonged first heart sounds were infrequently indicated, but splitting was easily recognized and frequently noted on the sonvelograms (Fig. 2, Case 179-1). Early systolic murmurs were heard by one examiner in 194 of 211 cases (Fig. 1, upper record). The other

examiner, the sonvelograms, and the Stethocardiette records revealed 125, 91, and 80 such cases, respectively. The relatively larger number of midsystolic murmurs on sonvelographic records resulted from the fact that they were frequently noted only as early systolic on auscultation (Fig. 2, Case 173-2). An interesting observation was a midsystolic click, which was clearly indicated by the stethograms and by two examiners (Fig. 2, Case 179-1). Loud and split-second sounds were common. Third heart sounds were heard most frequently by examiner No. 1. No diastolic murmurs were noted on the initial examinations in Phase I, and all findings were classed as functional except in those cases which were scheduled for reexamination in Phase IV.

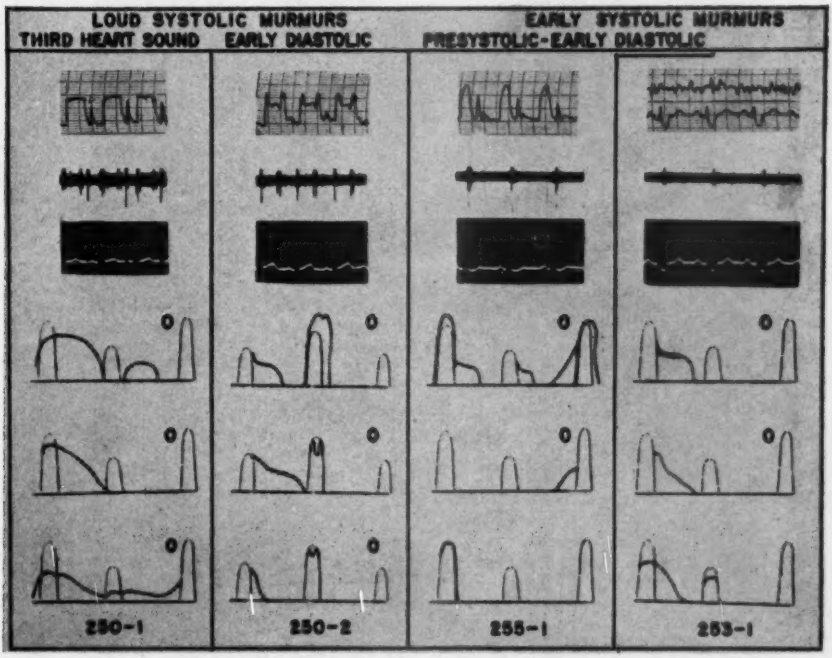

Fig. 4.—Sample cases from Phase III: Case 250-1, very loud systolic and diastolic murmurs noted on all records but one (mitral area); Case 250-2, pulmonary area of the same case revealing diastolic murmur on stethograms not noted by examiners; Case 255-1, sonvelogram indicated loud presystolic murmur, early systolic murmur, and diastolic murmur; these murmurs also noted by examiner No. 1; only a presystolic murmur was recorded by examiner No. 2; Case 253-1, sonvelogram completely obscured by background noise in this obese patient.

The incidence of various observations on the 34 school children in Phase II and in the 32 cases in Phase III have been tabulated together (Fig. 1, lower chart). Here again, murmurs in early systole were the most common finding, but midsystolic murmurs (Fig. 3, Cases 240-1 and 232-4) had greater incidence in these groups than in Phase I. Occasional late systolic murmurs were noted (Fig. 3, Case 224-2). Murmurs in the last portion of systole were recorded by the examiners only when the murmurs continued through the entire systolic period (Fig. 2, Case 251-1). In one case (237-1), that of a subject with tachycardia, the examiners reported a systolic murmur which actually occurred in the diastolic period, as

demonstrated by its relation to the electrocardiogram in both stethographic records. In Phases II and III, third heart sounds were identified on sonvelograms in 10 cases, and on 18 Stethocardiette records (e. g., Fig. 3, Case 226-1). Third heart sounds were noted on auscultation only by examiner 1 (Fig. 1). Early diastolic murmurs were indicated in 12 sonvelograms, 10 Stethocardiette records, and by the three examiners in nine, four, and five cases respectively. Typical records from

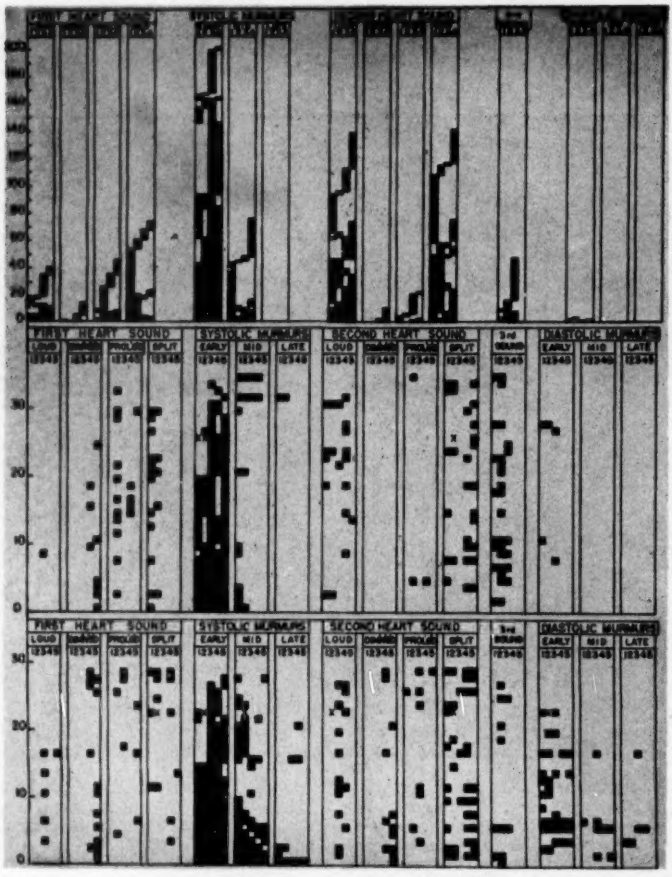

Fig. 5.—Data from Figure 1 replotted to indicate the degree of correspondence of findings from (1) sonvelograph (2) stethocardiograph, and (3, 4, 5) the auscultators. Early systolic murmurs were noted on all records from 44 children in Phase I (upper record), from eight children in Phase II (middle record), and 13 from Phase III (lower record).

Phase III are presented in Figure 4. Case 253-1 was that of an obese adult woman and represents an example of completely unsatisfactory stethography, since the heart sounds were faint and completely obscured by background noise. Fortunately, this rarely occurs.

The total incidence of findings indicated in Figure 1 can be seriously misleading because it obscures differences in individual cases. For this reason, the data were

replotted so that each case in which all four records agreed were tabulated at the bottom of each column. Next, those cases in which only three records agreed were added. This process was continued until notations on only one record appeared at the top of each column (Fig. 5). This method of organization revealed a remarkable lack of correspondence between the results obtained from the four sources. For instance, in only 44 cases was an early systolic murmur noted on all four records. Agreement for other observations in Phase I was even more infrequent.

In Phases II and III (Fig. 5, middle and lower charts), the cases were arranged as indicated above only for early systolic murmurs, and the remaining notations on each case appear on the corresponding horizontal lines. A greater degree of

TABLE 1.—*Initial Examination*

Case No.	Significant Observation	Objective Records			Auscultation		
		Heart Sound 1	Heart Sound 2	EKG	1	2	3
20	Loud second sound	...	...	...	..	O	X
55	Systolic murmur	O?	O?	...	F	F	..
	Presystolic murmur	O?	O?	...	..	..	X
75	Systolic murmur	O?	F	...	F	F	X
108	Early systolic murmur	F	O?	...	O?	F	X
124	Early systolic murmur	...	F?	...	O?	F	F
	Third heart sound	...	F	...	F	..	..
138	Left axis deviation	...	...	Left axis shift	..	..	..
139	Early diastolic murmur	O?	O?	...	F	..	..
150	Midsystolic murmur	O?	F	...	F	..	..
151	Systolic murmur	F	F	...	F	F	..
	Third heart sound or	...	F	...	F	..	..
	Early diastolic murmur	O	...	...	..	..	..
152	Midsystolic murmur in aortic area	O?	F	...	..	..	..
156	Systolic murmur	O?	...	...	F	..	..
	Diastolic murmur	O?	...	...	..	..	..
	Third heart sound	F	F	...	F	..	..
168	Early systolic murmur in aortic area	O?	O?	...	F	F	..
215	Systolic murmur (transmitted)	O?	O?	...	O?	F	O?
217	Systolic murmur (transmitted)	O?	F	...	F	F	O?
	Third heart sound	O?	F	...	F	..	..
224	Systolic murmur (transmitted) (late systolic in H. S. 1)	O?	F	...	O?	O	F
231	Systolic murmur (transmitted)	O?	O?	...	..	..	..
232	Systolic murmur (transmitted)	O?	O?	...	..	O?	O?
240	Systolic murmur (transmitted)	O?	O?	...	O	..	F
	Totals	14	8	1	5	3	3

correspondence in detecting early systolic murmurs occurred in both Phases II and III, but there was considerable discrepancy in the other observations.

From the 245 children examined in Phases I and II, 18 children returned for additional study. Five others were asked to return, but failed to appear. Of the five who could not be reexamined, one, with a condition classed as possible organic heart disease on the sonvelogram and by examiner No. 1, was under the care of a physician for rheumatic fever (Case 164). Another was under observation for the diastolic "murmur" illustrated in Figure 3 (Case 237-1). No additional information was obtained concerning the three other children. The notations which applied to the children selected for reexamination and the sources of these observations, i. e., heart-sound records, electrocardiograms, and auscultation, have been tabulated (Table 1). The stethographic records were read both rapidly and liberally. Four-

TABLE 2.—*Re*

Case No.	Significant Observation	Objective Records			Auscultation						Fluoroscopy *	Heart Rate
		H. S. 1	H. S. 2	EKG	a	b	c	d	e	f		
20	Early systolic murmur	O?	O?		F?	O	O?	O?	F	O?	LV+? RV+?	72
55	Presystolic murmur	O	O									
	Third heart sound	F	F								PVP+	92
	Early systolic murmur	O	O		O	O?	O?	O	F	F		
75	Early systolic murmur	F	F		F	F	F	O	F	F	PA+?	92
108	Early systolic murmur	O?	O		O?	F	O?	O?	O	O		
	Third heart sound or	F-or	F		O?						RV+?	
	Early diastolic murmur (into mid on stethogram)	O?	O						O		LV+?	84
	Presystolic murmur								O	O		
124	Early systolic murmur	O?	F		F	O?	O?	O	O	O		
	Third heart sound or										N	96
	Early diastolic murmur	O?	F		F				F			
138	Early systolic murmur	F	F		F	O?	O?	O?	O	F		
	Early diastolic murmur		O								PVP+	
139	Early systolic murmur	F	F		O?	F	F	F	F	O?		
	Third heart sound or											
	Early diastolic murmur	O?	F		O?	F			F	O?	PVP+?	68
	Presystolic murmur				O							
150	Early systolic murmur	F	F		F	F	F	F	F	F		
	Early diastolic murmur	O?	O?						O?		N	76
151	Systolic murmur (transmitted)	F	O?		F	F	F	F	F	F		
	Third heart sound or	O?	O?		F							
	Early diastolic murmur											
	Right axis deviation			O?								
152	Presystolic murmur	O	O						O			
	Aortic systolic murmur	F	F		F	O?	O?	O?	F	O?	LV+?	
	Diastolic murmur		O									
156	Presystolic sound	O?										
	Systolic murmur	O?	O?		F	F	O?	O?	F	O?	LV+?	72
	Third heart sound or	O?	F									
	Diastolic murmur											
168	Auricular sound or presystolic murmur	O	F					O?	O?			
	Early systolic murmur (transmitted)	O	F		O?	O	O?	O	O?	O?		
	Third heart sound or	O	F		F					O?	N	100
	Early diastolic murmur											
	Left axis deviation			O?								
215	Early systolic murmur (transmitted	O?	O?		F	F	F	O	F	O?	PVP+	
	Third heart sound or	O?	O?						F		LV+?	54
	Early diastolic murmur											
217	Presystolic murmur	O?								O?		
	Systolic murmur (transmitted)	O?	O?		O?	F	F	O	O?	O?		
	Third heart sound or	O	F		F			O?	F		RV+	80
	Early diastolic murmur											
	EKG-Right axis shift			N								
224	Late systolic murmur	O?	O?		O	O	O?	O	O?	O		
	Auricular sound or presystolic murmur	O?									RV+	
	EKG-Asynchronous depolarization			O?							PVP—?	84
231	Presystolic murmur	O	O				O?		O			
	Systolic murmur (transmitted)	O?	O?		O?	F	O?	O	O?	O		
	Third heart sound or	O	O?					O?	F		N	100
	Early diastolic murmur											
	Left axis deviation			O?								
232	Aortic systolic murmur	O?	O?		F	O		O	F	O?	N	76
	Left axis deviation			O?			O?					
240	Systolic murmur	F	F		O	O	O?	O	F	O		
	Third heart sound	F	F								RA+	
	Totals	14	14	5	8	9	10	14	8	13		

* Symbols used in this tabulation have the following significance: LV, left ventricle; RV, right ventricle; PVP, pulmonary vein pulsation; PA, pulmonary artery; N, normal; RA, right auricle; +, enlarged or elevated; —, depressed.

† Three periods, in 1944, 1945, and 1949.

examination

Blood Pressure	Sedimentation Rate, Mm.	Anti-streptolysin, Units	Wetzel Grid: Date Started	Wetzel Grid: Growth Failure	History	Pre-examination	Phase I: Stethogram 1	Phase I: Stethogram 2	Phase I: Auscultation 1	Phase I: Auscultation 2	Phase I: Auscultation 3	Final Diagnosis	Previously Unsuspected
84/40	2		5/48	Since 2/51						x	—	O?	x
112/68	10	100	9/44	None	Unexplained fever		x	x			—	O?	x
Left arm 112/60	15	625	9/45	9/45-9/49	Rheumatic fever?		x				—	P	
102/60	3	166	10/47	Slight 10/47-10/48	Rheumatic fever	O?		x	x		—	O?	
Left arm 124/80	5	12	10/46	Irregular ?					x			O?	x
Right arm 98/55	7	625	0	0			x	x				O?	x
102/60	21	250	10/46	Since 10/46			x	x				O?	x
94/60	8	125	0	0			x					P	
			0	0			x					P	
135/78			10/46	None	Rheumatic fever?		x					O	x
98/62	36	12	10/48	Since 10/48	Rheumatic fever?		x					O?	x
126/80	26	> 12	9/49	None			x	x				O	x
100/54	19	100	9/44	?		O?	x	x	x		x	O?	
108/64	10		5/48	Since 5/49	Rheumatic fever	O?	x				x	O	
114/80	42	625	9/50	On 9/50	Congenital heart disease	O?	x		x	x		O	
100/60	45	333	0	0			x	x				O	x
90/60	42	1,250	9/47	Since 9/48		O	x	x		x	x	O?	
98/50	36	50	5/48	Since 5/49			x	x	x			O	x
		4			7	4	15	9	5	3	3		10

teen sonvelograms and eight Stethocardiette records were interpreted as indicating a need for further study. By auscultation, five, three, and three cases were similarly designated by the three examiners, respectively. Considerable difference of opinion concerning the significance of the observations appeared in nearly all cases.

Information gained during the reexamination appears in Table 2. The incidence of positive findings in this group was significantly greater during reexamination than during the initial examination. This series was known to be a preselected group, and the tests were conducted under improved conditions, so the interpretations were probably less conservative.

The interpretations of stethograms, electrocardiograms, and auscultation are listed in the first nine columns in Table 2. Results of the laboratory tests appear

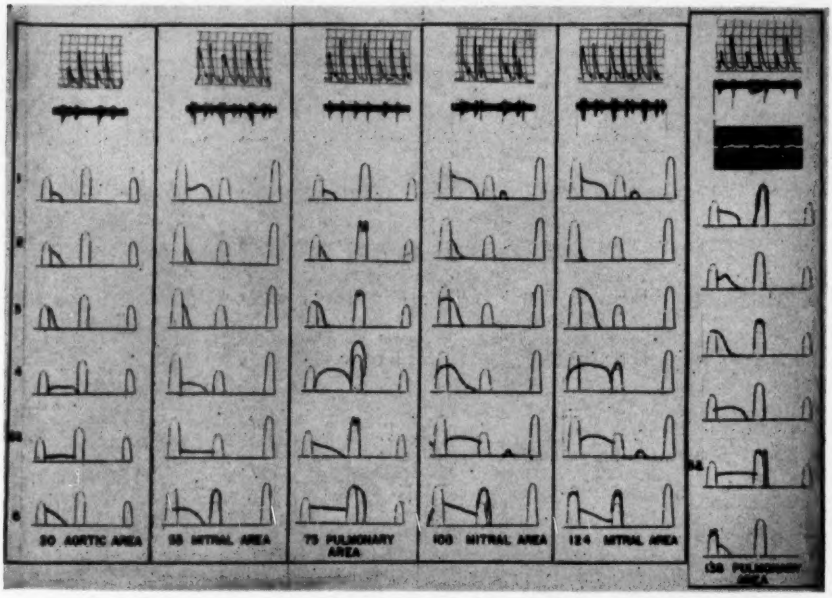

Fig. 6.—Sample records from two types of stethographs and from auscultation by six examiners during Phase IV. Note that systolic murmurs are indicated on all records; third heart sounds appear on some records from Cases 55 and 124. The loud early diastolic sound in Case 108 may be an early diastolic murmur.

in the next five columns. Unexplained fever and histories indicating rheumatic fever or congenital heart disease are noted as "History." On the original request for parental permission to conduct the initial examination, the parents were requested to indicate to the best of their knowledge whether the child had no heart disease, suspected heart disease ("0?") or definite heart disease ("0"). The responses to this question are listed under "Preexamination." For each case, the stethographic and auscultative records of Phase I, which prompted reexamination during Phase IV, are indicated as "Phase I."

After all the data had been assembled, each case in Phase IV was considered individually by the six examiners and, by majority vote, was classified for purposes

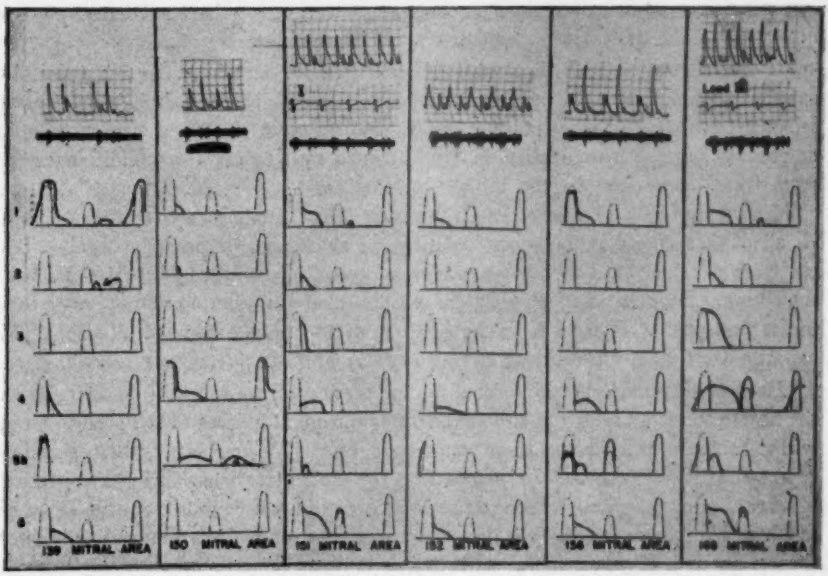

Fig. 7.—Sample records. Presystolic murmur was noted on one or more records in Cases 139 (examiner 1), 152 (both stethograms and examiner 5b), and 168 (both stethograms and examiners 4 and 5b). Third heart sound or early diastolic murmur appears in Cases 139 (both stethograms and examiners 1, and 2), 150 (both stethograms and examiner 5b), 151 (both stethograms and examiner 1), 152 (both stethograms), 156 (both stethograms), and 168 (both stethograms and examiner 1). Note the discrepancy between stethography and auscultation of the low-frequency murmurs in Case 152.

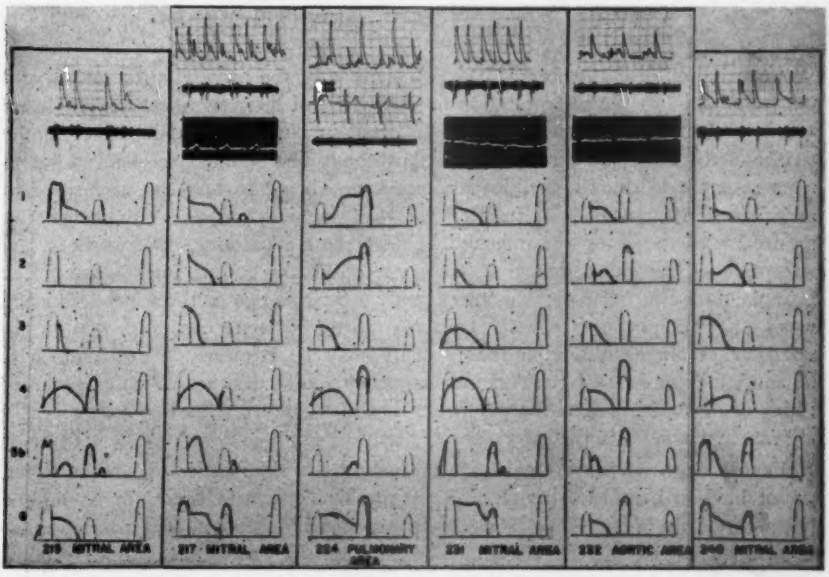

Fig. 8.—Sample records. All cases illustrated were finally classified as either organic or possible organic heart disease. Note the wide diversity of the patterns drawn by the examiners.

of tabulation as functional (F), possibly organic (0?), or organic heart disease (0) (Table 2, "Final Diagnosis"). This classification can be considered only as indicative of the desirability of further study of the case.

If sonvelographic records alone had been used for screening the 245 cases, 14 subjects would have been suspected of heart disease (Table 1). (One case was selected from the electrocardiogram.) Of these, 12 were classed as having organic or possible organic heart disease in the combined ratings, but three additional subjects were overlooked on the initial sonvelograms (Cases 20, 108, 124). Nine children would have been selected on the basis of the Stethocardiette records alone. In all of these the diagnosis was "confirmed" as organic or possibly organic, but six were overlooked. The first examiner suspected heart disease in five children, the second examiner noted three cases, and the third examiner could not participate in the first part of Phase I but selected three of 146 cases examined. A total of 15 children were finally classed as having organic or possibly organic heart disease.

Each of the examiners illustrated his impression of the intensity and timing of the heart sounds by means of simple diagrams during all phases of the study. Since verbal communication concerning sounds verges on the impossible, these sketches represent the only means of comparing the auscultatory findings of different observers. For this purpose, the complete records of heart sounds from the 18 cases in Phase IV are presented. Systolic murmurs were usually drawn immediately after the first sound, even when the stethograms indicated maximum intensity in mid-systole or late systole. Certain features noted on sonvelograms were commonly overlooked on other records: (*a*) third heart sounds (Fig. 6, Cases 55, 124; Fig. 7, Cases 151, 156, 168; (Fig. 8, Cases 215, 217), (*b*) presystolic sounds (Fig. 6, Case 55; Fig. 7, Cases 152, 168; Fig. 8, Cases 215, 217), and (*c*) splitting of heart sounds (Fig. 6, Case 55; Fig. 7, Case 156). Third heart sounds and presystolic sounds are characteristically low pitched and difficult to hear.

COMMENT

Auscultation of the heart involves two steps: (1) the perception of sounds and murmurs, and (2) the interpretation or evaluation of their significance. The heart sounds are absorbed, attenuated, and distorted in passing from the heart to the surface of the chest and through the stethoscope.[4] The auditory mechanism varies in its response to sounds of different frequencies, being particularly insensitive to low-frequency sounds of brief duration. Most of the heart sounds are fundamentally low-frequency noises of low intensity. Under these conditions, differences in the perception of the same sounds by different observers appear unavoidable. For example, third heart sounds, which frequently appear as two or three low-frequency waves on stethograms, are fairly regularly noted by some observers and rarely heard by others even though the intensity may be relatively great. Similarly, murmurs may be heard by one examiner and missed by another. Finally, accurate timing of murmurs is apparently difficult. The auscultators tended to assign nearly all systolic murmurs to the early systolic period.

Even though no criteria exist for evaluating the significance of sounds which cannot be heard, the sensitivity of stethographic equipment need not be limited by the threshold of audibility. Thus, the sonvelogram appears superior to auscultation with reference to both sensitivity and timing. However, adventitious sounds,

which seriously obscure stethographic records, can be recognized and ignored during auscultation. When background noise is present, it is necessary to ascertain that any particular deflection on stethograms recurs regularly in the same phase of the cardiac cycle.

In selecting cases for reexamination among the school children, specific criteria were used in scanning the sonvelograms. However, the auscultators were often unable to indicate precisely what characteristics of the heart sounds prompted the selection of specific cases, particularly those having only systolic murmurs. Intensity, transmission, and "quality" of the heart sounds were frequently mentioned, but it seemed that the evaluation of heart noises depended largely on past experience. To some extent, auscultation apparently involves the same characteristics of auditory perception that allow a person to recognize a familiar voice even when distorted by a telephone. Thus, both auscultation and stethography have distinct advantages, and combined use of the two methods should be superior to one alone.

The most prominent feature of the present study is the lack of specific criteria for heart disease. Only one case (224) in the entire series of school children was unanimously considered organic or possible organic heart disease by auscultation and stethographic interpretation during Phase IV, but even this case was classified as functional during Phase I by one examiner and on the Stethocardiette record. Every other case was considered to have either no murmur or a functional murmur by one or more observers. After accumulating all available data there remained a critical problem of deciding which of the results were correct. The problems implied by classifying cases as "possible" organic heart disease can be resolved only by extended observation and study.

CONCLUSIONS

In a controlled experiment, extreme variability was demonstrated in detecting and interpreting heart murmurs, particularly among children without well-developed organic heart disease.

In this particular study, stethographic recordings compared favorably with auscultatory examination in selecting cases with possible organic heart disease. Five factors contributed to this result. (*a*) The stethographic records were interpreted very liberally, while the auscultators were very conservative in their evaluation of the cases. (*b*) More uniform criteria for selection is possible on objective records than is available during auscultation. (*c*) Timing of murmurs was considerably more accurate using the stethographic records. (*d*) Laboratory tests during reevaluation contributed data which were not available during the initial screening. (*e*) Of greatest significance was the fact that the cases reexamined were known to be a preselected group and were evaluated with less conservatism.

As judged from these data, heart murmurs having maximum intensity in the midsystolic or late systolic periods are much more likely to be associated with other signs of organic heart disease than are murmurs which appear solely in early systole.

The diagnosis of organic heart disease is a highly subjective process in the absence of fairly well-developed signs and symptoms.

Auscultation is probably not as accurate a diagnostic method as it is generally considered, except in the hands of those with exceptional auditory acuity and extensive training.

The interpretation of stethograms is difficult in the presence of adventitious sounds which can be recognized and ignored during auscultation. It was impossible to distinguish third heart sounds and early diastolic murmurs on the sonvelographic records.

During auscultation it is possible to recognize and to interpret familiar sounds on the basis of past experience by a process which corresponds to recognizing a familiar voice over the telephone. This intangible ability cannot be duplicated by stethography.

Supplementing auscultative findings with objective records of heart sounds in many instances is superior to either technique alone.

The technical assistance of Richard M. Ellis and Priscilla Anderson is acknowledged.

CHILDHOOD PNEUMONIA, A COMMON CAUSE OF BRONCHOPULMONARY DISEASE

Importance of Prophylaxis and Adequate Therapy

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IT IS generally believed that childhood pneumonia, once a serious illness, no longer presents a major pediatric problem. Indeed, modern therapeutics do control the acute phase of this illness in most instances, and immediate complications have become rare. However, as the following study will attempt to demonstrate, current antibacterial treatment is not likely to prevent bronchopulmonary disease, a frequent aftermath of childhood pneumonia. The fact that pneumonia not only is an acute self-limited episode but also may be a potentially chronic condition calls for more vigorous therapeutic and prophylactic measures than are usually held necessary.

Daily experience indicates that severe respiratory infections still are prevalent among children. Certain statistics [1] even suggest a recent increase in these illnesses, including pneumonia. Undoubtedly, the number of cases which are reported and in which the patients are hospitalized no longer indicates the actual occurrence of pneumonia, since the use of sulfonamides and antibiotics obscures the true character of the disease in many instances. Recurrences of certain respiratory conditions in the same child continue to be frequent, even when antibiotics have been given previously. Surveys conducted in Rochester, N. Y.,[2] during the past 3 years revealed an even higher incidence of relapsing bronchitis, disabling sore throat, and similar illnesses than the 19% found by Downes 10 years ago.[3]

It is this type of recurrent respiratory sickness that often ushers in suppurative bronchopulmonary disease.[4] Its common complication, bronchiectasis, alone is esti-

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From the Chest Clinic, Genesee Hospital.

Read before the Section on Pediatrics at the 100th Annual Session of the American Medical Association, Atlantic City, June 15, 1951.

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4. (*a*) Downes.[3] (*b*) Nelson, W. E.: Mitchell-Nelson Textbook of Pediatrics, ed. 5, Philadelphia, W. B. Saunders Company, 1950. (*c*) Leys, D.: Chronic Pulmonary Catarrh, London, H. K. Lewis & Co., Ltd., 1927. (*d*) Raia, A.: Bronchiectasis in Children, with Special Reference to Prevention and Early Diagnosis, Am. J. Dis. Child. **56**:852 (Oct.) 1938. (*e*) Diamond, S., and VanLoon, E. L.: Bronchiectasis in Childhood, J. A. M. A. **118**:771 (March 7) 1942. (*f*) Finke, W.: Prospects for Prevention of Chronic Bronchitis and Bronchiectasis, J. Pediat. **33**:29 (July) 1948. (*g*) Field, E.: Bronchiectasis in Childhood, Pediatrics **4**:21 (July); (*h*) **4**:231 (Aug.); (*i*) **4**:355 (Sept.) 1949.

mated to represent about 5% of all diseases in childhood.[5] Pneumonia has been known to play an important role in the evolution of this condition.[6] It was thought that the history of recently observed children with bronchopulmonary disease might disclose to what extent pneumonia combated with antibacterial agents still appears as an outstanding etiologic factor.

Of 176 children with the above syndrome of frequent and prolonged respiratory illness, more than half had been affected by pneumonia, or what probably was pneumonia (Table 1). In the majority of cases the clinical and roentgenologic findings indicated an advanced stage of bronchopulmonary infection. Bronchographic studies in 18 children revealed definite bronchiectasis in 7 and doubtful bronchiectasis in 8. Most of these children had been treated with sulfonamides, penicillin, aureomycin, or chloramphenicol (chloromycetin®) when affected by

TABLE 1.—*Significant Features in Histories of 176 Children with Bronchopulmonary Disease, Observed 1945-1950*

Total No. of Cases	Age Distribution, Yr.			Family History of Chronic Broncho-pulmonary Disease	Onset of Disease in Infancy	Pneumonia, Diagnosed as Such	Respiratory Episodes, Probably Pneumonia
	Under 5	5-9	10-15				
176	91	62	23	86.2%	72.4%	43.4%	25.3%

TABLE 2.—*Periods of Hospitalization, Incidence of Residual Pathology, and Subsequent Readmissions of 224 Children with Primary Pneumonia*

Total No. of Cases	Periods of Hospitalization, Days			Clinical Evidence of Residual Pathology When Discharged	Readmission for Respiratory Illness	
	1-7	8-14	15 or More		Outpatient Department	Hospital
224	65.5%	19.3%	15.2%	26.8%	22.9%	12.1%

pneumonia or equally severe respiratory episodes. Obviously, modern therapeutics as now given for these illnesses did not prevent the development of chronic disease.

There are indications that present management of pneumonia does not sufficiently consider the importance of complete cure. Of 224 children consecutively hospitalized for primary pneumonia between 1946 and 1950, the majority were treated with antibiotics and/or sulfonamides from one to seven days (Table 2). At the time of discharge from the hospital, 26.8% of the whole group presented clinical signs of incompletely resolved pneumonia. Roentgenographic rechecks in 48 children revealed residual pathology in about one-half of them. Of the 224 children, 22.9% returned to the outpatient department within these four years because of recurrent and persistent respiratory illnesses. An additional 12.1% had to be rehospitalized, the majority for subsequent attacks of pneumonia. Most patients again requiring medical care were among those who apparently had not recovered completely upon leaving the hospital.

5. Buckles, M. G.: Surgical Treatment of Bronchiectasis in Children, J. A. M. A. **143**:344 (May 27) 1950.

6. (*a*) Footnote 4*c*, *d*, *e*, *f*, *g*, *h*, and *i*. (*b*) Amberson, J. B., Jr.: Significance of Unresolved, Organizing or Protracted Pneumonia, J. Michigan M. Soc. **42**:599 (Aug.) 1943.

It can be assumed that both in private practice and in other institutions a similar, unsatisfactory situation prevails. Other series of cases have shown that with antibiotic therapy the subsidence of fever and of symptoms is not always paralleled by complete resolution of the pneumonic process.[7] Cases probably representing unresolved pneumonia are now rather often observed, especially in atypical pneumonia, in which more than casual antibiotic treatment is held unnecessary even when roentgenograms reveal persistent abnormal shadows.[8] Therefore it is to be feared that the present tendency to shorten antibiotic therapy to as little as a single dose [9] and to abbreviate convalescence will result in an increasing number of children with chronic respiratory disease.

For effective treatment of pneumonia, especially in children, not only the severity of the condition but also the type of pneumonia must be considered. In the past, adequate treatment and convalescence were emphasized more than at present, even for pneumococcic pneumonia which usually resolves without leaving residua. Delayed or incomplete resolution usually indicates nonpneumococcic suppuration with bronchial obstruction and atelectasis.[10] Therefore far-sighted pediatricians have always urged prolonged care and follow-up study of pneumonia patients in whom the disease did not resolve promptly.[11]

As is generally realized, differentiation between the various types of pneumonia is now more difficult than it was a decade ago, since even superficial antibacterial treatment, given in the beginning of the illness, may alter the whole picture.[10f] Regardless of currrent controversies on classification and etiology, suppurative lung infection of primary or secondary character still does account, as it did in the past, for a large number of cases diagnosed as pneumonia of one type or another.

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9. Schwentker, F. F.: The Treatment of Pneumonia in Children, J. South Carolina M. A. **46**:69 (March) 1950. Crigler, J. F., Jr.; Lysaught, J. N., and Fisher, E. G.: Treatment of Pneumonia in Children with a Single Injection of Repository Penicillin, J. A. M. A. **143**:532 (June 10) 1950. Friderichson, C., and Walther, T.: Treatment of Pneumonias in Children with a Single Massive Dose of Sulfathiazole, Ann. paediat. **175**:285 (Oct.) 1950. Vollmer, H.; Pomerance, H. H., and Brandt, I. K.: Treatment of Pneumonia with a Single Oral Dose of a Penicillin-Sulfadiazine-Sulfamerazine Combination, New York J. Med. **50**:2993 (Oct. 1) 1950.

10. (*a*) Nelson.[4b] (*b*) Leys.[4c] (*c*) Amberson.[6b] (*d*) Benstead, J. G.: The Flora of 100 Bronchial Secretions, Lancet **1**:206 (Feb. 4) 1950. (*e*) Gleichman, T. K.; Leder, M. M., and Zahn, D. W.: Major Etiological Factors Producing Delayed Resolution of Pneumonia, Am. J. M. Sc. **218**:369 (Oct.) 1949. (*f*) Rubin, M.: Diseases of the Chest, Philadelphia, W. B. Saunders Company, 1947.

11. Leys.[4c] Raia.[4d] Field.[4l] Biermer, A.: Krankheiten der Bronchien und des Lungenparenchyms, in Handbuch d. spez. Path. u. Therap., Stuttgart, Ferdinand Enke, 1865, Vol. 1. Hutinel, V: Les Maladies des enfants, Paris, Asselin et Houzeau, 1909, Vol. 4.

Unlike pneumococcic pneumonia, a pyogenic pulmonary infection may require several weeks to resolve, even with antibacterial therapy. Newer antibiotics may effect more prompt subsidence of acute symptoms than may sulfonamides or average doses of penicillin. Apparently, however, none of these agents, if given briefly, assures the complete resolution which is a prerequisite for actual cure. In my experience, relapses are likely to occur in superficially treated pneumonia, no matter which antibiotic is given. Therefore a patient should not be considered fully recovered merely because fever and symptoms have subsided. All too often the hope for an eventually complete cure without further intervention does not materialize. Treatment, or at least prolonged convalescence, should be continued until clinical and roentgenologic evidence of residual pathology has disappeared completely.

A prolonged and conscientious observation of the affected child is essential to prevent and control subsequent relapses and thus avoid new damage to the lungs. Bronchopulmonary disease usually develops insidiously and under various disguises.[4f] Thus, a complacent attitude which dismisses recurrent symptoms as "upper respiratory infection," "virus infection," or "allergy to colds," all too often is responsible for future crippling pulmonary disease. Unfortunately, frequent reexaminations after an attack of pneumonia have generally not been considered essential in children. Chest roentgenograms are taken only rarely, although when done they often reveal unsuspected pathology. Leys,[4c] Downes,[3] and I [2] have urged that follow-up examinations in potentially chronic cases be included in school and preschool health programs.

Complete cure of pneumonia often cannot be accomplished because an apparently acute lesion may represent extension of preexisting bronchial disease to the peribronchial structures. Field [4g] and other students of bronchiectasis stress the fact that persistent cough had been present in many children before pneumonia developed. For example, of the 224 children with primary pneumonia mentioned in Table 2, 67.9% had been affected by recurrent croup, bronchitis, asthmatic bronchitis, etc., while 12.5% presented a history of previous attacks of pneumonia.

It is to be expected that any therapy may be less effective in pneumonia which occurs as a complication of long-standing disease than in typical pneumonia involving a previously healthy lung. Therefore, therapeutic failure of penicillin in atypical pneumonia does not exclude the bacterial origin of the disease. In my experience penicillin administered parenterally in daily doses of up to 600 mg. (1,000,000 units) often eradicates acute symptoms and signs in pneumonia supposedly of viral origin which did not respond to smaller doses.

Thus pneumonia which takes an unusual course and responds only poorly to treatment should be properly evaluated; if primary or secondary infection is evident, or even suspected, vigorous antibiotic therapy should not be delayed.

Prevention of pneumonia, however, is more rational than the most effective therapy and should be undertaken. In this connection it is important to mention that the majority of the 224 pneumonia patients had been acutely ill for more than one week, and 18% for more than two weeks, prior to their hospitalization. Usually, the respiratory condition had been considered insignificant until the severity of the illness became obvious. The reluctance to use antibiotics at an early stage of respiratory infection was most noticeable when infants were concerned.

Undoubtedly the incidence of pneumonia in children could be decreased if these therapeutics, especially penicillin, were given more boldly than is usually done.

Nearly all minor upper respiratory infections may be precursors of more severe conditions, especially in persons with previous major respiratory episodes. Therefore, the use of antibacterial agents in the treatment of bronchitis and similar illnesses has been justly advocated as a rational measure for prevention of pneumonia.[12] However, superficial and episodic therapy often allows residual infection to continue, thus causing early and serious recurrences. In my experience, prolonged treatment with adequate doses accomplishes more lasting results.[13] Current investigations indicate that prophylactic treatment of children who are subject to recurrent respiratory infection can ward off serious complications, including pneumonia.[14]

Prevention of respiratory illnesses should, of course, be our ultimate goal. It is generally believed that children are most likely to contract these infections from

TABLE 3.—*Prevalence of Disabling Respiratory Infections Among Children of Two Types of Families in a Single Housing Unit*

Type of Family	No. of Families	No. of Children	History of Pneumonia in Children	No. of Families Observed for 2 Yr.	No. of Children	Occurrence of One or More Attacks During 2-Year Period			
						Pneumonia	Laryngitis, Bronchitis	Sore Throat, Tonsillitis	Influenza, "Virus Infection"
Chronic bronchopulmonary disease in 1 or more adults	64	166	22.3%	45	125	17.6%	43.1%	25.6%	6.4%
No chronic bronchopulmonary disease in adults	99	269	4.9%	45	106	5.6%	6.6%	15.0%	3.7%

TABLE 4.—*Results of Contact Examinations in Families of Sixty Children with Bronchopulmonary Disease*

Index Cases					Siblings			Adult Household Members			
Age Distribution, Yr.											
Under 2	2-5	5-15	Total	History of Pneumonia	Total No.	With History of Pneumonia	With Bronchopulmonary Disease	Total No.	With History of Pneumonia or Epidemic Influenza (World War I)	With Chronic Bronchopulmonary Disease	With Proved Bronchiectasis
26	19	15	60	68.2%	92	49.5%	31	148	89.0%	51	24

persons outside their homes, especially in school. Except for the hazard of occasional colds, pneumonia, or other acute infections within the family, young children are held to be more protected in infancy than later on.[12a] However, certain facts contradict this view. Children who experience recurrent tonsillitis, laryngitis, tracheobronchitis, and eventually pneumonia, usually show this tendency from early childhood on and not only after entering school. Consequently, the onset of chronic respiratory disease, including bronchiectasis, often can be traced to infancy.

12. (*a*) Paterson, M.: Diseases of Children, London, Edward Arnold & Co., 1948, Vol. 1. (*b*) Adams, J. M.: Common Respiratory Tract Infections, in Yearbook of Pediatrics, Chicago, Year Book Publishers, Inc., 1950. (*c*) Kirby, W. M. N.: Recent Trends in Antibiotic Therapy, J. A. M. A. **144**:233 (Sept. 16) 1950. (*d*) Fisher, A. W.: The Present Status of Sulfonamide Therapy in Pediatrics, New York J. Med. **51**:225 (Jan. 15) 1951.

13. Finke, W.: Reversibility of Early Bronchiectasis: Its Implications for Therapy and Prevention, New York J. Med. **51**:1163 (May 1) 1951.

14. To be published.

In the majority of the 176 children affected by bronchopulmonary disease, the condition had its onset before the age of 2 (Table 1). This "susceptibility" to respiratory sickness in young children, unexplainable as it appears to some observers, strongly suggests that intrafamilial contacts, rather than extrafamilial sources of infection, are the cause of children's respiratory sickness. Moreover, Leys's [4e] and Downes's [3] observations indicate that it is familial chronic respiratory disease, rather than an occasional episode, that accounts for the child's ailment.

In Tables 1, 3, and 4 the results of additional pertinent investigations are summarized. They, too, suggest that bronchopulmonary disease exhibits a familial incidence. It can safely be assumed that this feature is due chiefly to infection of children by relatives with chronic bronchitis, chronic asthma, chronic sinusitis, and similar conditions.[15]

Thus it appears that the respiratory health of a person depends chiefly on freedom or protection from chronic respiratory disease in his own family during his early childhood. By detecting such contacts, mitigating their communicability, and giving particular attention to exposed children, respiratory disease, including pneumonia, may well cease to be a major pediatric problem.

SUMMARY

Present treatment of childhood pneumonia does not always take into consideration its potentially chronic character. Prolonged antibiotic therapy and follow-up study, rather than a short period of treatment, promise eradication of residual pathology which otherwise may lead to chronic bronchopulmonary disease.

Since an apparently acute pneumonic lesion often actually represents an exacerbation of preexisting bronchial disease, prevention of pneumonia itself seems even more rational. This may be accomplished by early and effective treatment of respiratory infections that pave the way for pneumonia.

From a public health point of view, prophylaxis in this field should be directed toward protection of young children from familial contacts with common acute or chronic respiratory diseases.

333 Park Ave. (7).

The cooperation of the Rochester Health Bureau, Dr. A. Kaiser, Director, in conducting the field investigations related to this study, is acknowledged.

ABSTRACT OF DISCUSSION

DR. CAMILLE D. CAYLEY, New York: Before antibiotics and chemotherapeutics were used, 30 to 50% was the pneumonia death rate in children under 3 years old. The figure is less than 1% now.

Dr. Eugene McEnery, of the Children's Memorial Hospital in Chicago, quoted new statistics a week ago, at the meeting of the American College of Chest Physicians. He said that in 1950, one-third as many patients with pneumonia were treated in his hospital as 12 years ago. All of us pediatricians have had the same experience in our hospitals and in our private practices. It is obvious that antibiotic therapy in the prepneumonia state is responsible for this happy state of affairs. In big cities the patients' parents themselves demand antibiotic therapy in severe colds before pneumonia develops.

DR. McEnery quotes even more dramatic figures concerning the complications of pneumonias. In 1938, seventy-six empyemas occurred in the Children's Memorial Hospital. In 1950 only one

15. Leys,[4e] Finke,[4f] Field,[4g] Paterson,[12a] Finke, W.: Prevention of Chronic Pulmonary Disease Following Epidemic Respiratory Infection, Am. Pract. **2**:457 (March) 1948.

occurred. In 1938 twenty patients with bronchiectasis were hospitalized; in 1950 there were only three. Unresolved pneumonia is becoming a myth. Only 3 cases were seen in 1950, against over 20 in 1938.

My experience in New York is very similar to Dr. McEnery's in Chicago. However, I believe that nose and throat cultures should be done before the first dose of antibiotic is administered, in order to select the most effective drug. At Temple University, Philadelphia, they use the simple "paper disc sensitivity group test" which was described at this meeting by Dr. Spaulding. In severe cases we do bacteriological studies and apply combination therapy until the results of our bacteriological findings are available. After this we stop the use of one or two of the drugs, retaining the one which is most bactericidal for the pathogen involved.

In pneumonia we never treated for two to three days only, guided by temperature and symptoms alone. The termination of therapy is decided when, besides the signs, symptoms, and temperature, the chest roentgenogram, blood count, and sedimentation rate also become normal. This usually occurs three to seven days after defervescence. There are pediatricians who stop treatment before the chest roentgenogram becomes normal, but even they treat about seven days after defervescence. I do not think a well-treated pneumonia patient needs more than 10 to 14 days of convalescence after discharge from the hospital. Maybe virus pneumonias respond a bit more slowly.

A special follow-up clinic for well-treated pneumonia patients with normal chest roentgenograms, normal blood counts, and normal erythrocyte sedimentation rates, without signs and symptoms upon discharge, would be an unnecessary luxury. I think it is more profitable to teach the parents two facts: (1) that elevation of temperature means disease which a doctor should handle, and (2) that a cough or other signs of respiratory infection, with or without elevated temperature, lasting longer than 7 to 10 days, require medical investigation. Fortunately, parents in New York are sufficiently health conscious to have their children examined when the first symptoms of disease occur; therefore, early treatment of pneumonia is not a problem to us.

Asthmatic bronchitis is not very rare; however it is usually intermittent, and therefore it rarely causes chronic bronchopulmonary disease.

Dr. Finke defines bronchopulmonary disease as "chronic infection of the lower respiratory tract." I find this quite rare in children, in contrast to chronic upper respiratory disease which, in the climate of New York, is very common and hard to cure.

Dr. Finke said that among his 176 children with chronic bronchitis, bronchiectasis, and asthmatic bronchitis 78, or 44%, had a history of pneumonia, the majority being treated with chemotherapy and antibiotics. He concludes from this that in many other children treated for pneumonia by current methods an unfavorable outcome must be expected. I disagree with his prognostication on two scores. 1. According to statistical expectations, about 60 of the 176 patients would have died of pneumonia if not treated by modern drugs. 2. That 80% of the 224 pneumonia patients studied had had previous attacks of pneumonia or some other recurrent respiratory disease means to me that their present pneumonitis was just an episode in preexisting chronic bronchopulmonary disease. We all know, for instance, that asthmatic children are prone to have recurrent minor pneumonias. Still, the pneumonia is not responsible for the asthma, but the allergy predisposes these children to both.

If at the time of discharge 26% of Dr. Finke's 224 pneumonia patients presented clinical signs of incompletely resolved pneumonia and 44% had abnormal chest roentgenograms, I certainly agree with him that the method of treatment was improper, either as to the selection of the drug for the particular pathogen causing the pneumonia or as to the length of treatment. I think this mode of treatment, and not the short convalescence, is responsible for the 12% recurrence. In practically all diseases of adults, the early ambulation proved beneficial. I do not see why short convalescence for properly treated children who recovered completely from pneumonia would be harmful. We know that the regenerative ability of children is greater than that of adults.

I also agree with Dr. Finke that virus pneumonia probably is not more common now than before. However, it is better differentiated these days from bacterial pneumonias for the following reasons: 1. We are in the habit of doing more bacteriological studies. 2. We are in a position to use the negative therapeutic test with the sulfonamides and with penicillin to segregate virus pneumonias from other types.

With modern treatment, it is rare, aside from Staphylococcus pneumonia in cystic fibrosis of the pancreas, for even virus pneumonia to last longer than two weeks. Usually the fever and toxic symptoms disappear in two to three days and all the other roentgenologic and laboratory evidence of pneumonia after the first week.

In conclusion, I wish to make the following statements. 1. I agree with Dr. Finke that pneumonia in children should be treated by well-chosen modern drugs, on the basis of knowledge of the etiological factor. 2. Treatment should be intensive and should last a few days after all clinical, laboratory, and roentgenologic evidence of the disease has disappeared. 3. I would not recommend, in health or because of exposure, prophylactic antibiotic therapy to prevent chronic bronchopulmonary disease. We have ample time to treat pneumonia properly and successfully when it occurs. 4. According to most pediatricians, since the chemotherapeutic and antibiotic era, chronic bronchopulmonary disease is declining among children. 5. Prolonged convalescent care and special follow-up clinics for well-treated pneumonia patients are not essential, to my mind, provided parents are alerted for signs of recurrence and for signs of chronic respiratory disease.

TREATMENT OF HEMOPHILUS INFLUENZAE MENINGITIS

Comparison of Aureomycin Alone Versus Aureomycin, Streptomycin, and Gantrisin®

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WITH THE advent of each new antibiotic it is necessary to evaluate its usefulness in the treatment of those diseases which have not responded in an entirely satisfactory manner to previous methods of therapy. One such disease is meningitis caused by the bacillus Hemophilus influenzae. This disease, which was successfully combated by a combination of antibacterial serum and sulfonamides in about half the patients treated, was found to respond much better to streptomycin, usually in combination with serum and sulfonamides.[1] However, since several studies involving small numbers of patients had indicated that some patients would recover when treated with aureomycin used alone,[2] it seemed important to us to determine whether the use of aureomycin alone would be optimal therapy or whether supplemental use of some other therapeutic agents would give better results. Since sulfonamides and streptomycin were the drugs which had been shown previously

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1. Applebaum, E., and Nelson, J.: Streptomycin in the Treatment of Influenzal Meningitis, J. A. M. A. **143**:715 (June 24) 1950. McMorrow, K. J., and Top, F. H.: Treatment of Hemophilus Influenzae B Meningitis: Report of 67 Cases, Pediatrics **5**:452 (March) 1950. Ounsted, C.: Haemophilus Influenzae Meningitis Treated with Streptomycin, Lancet **2**:639 (Oct. 8) 1949. Crook, W. B., and Clanton, B. R.: Hemophilus Influenzae Meningitis, Observations on Treatment of 110 Cases, Pediatrics **4**:643 (Nov.) 1949. Smythe, P. M.: Haemophilus Influenzae Meningitis Treated with Streptomycin, Lancet **2**:485 (Sept. 25) 1948. Hoyne, A. L., and Brown, R. H.: Intrathecal Therapy not Required for Haemophilus Influenzae Meningitis, J. A. M. A. **136**:597 (Feb. 28) 1948. Gottlieb, B., and Forsythe, C.: Haemophilus Influenzae Meningitis in Infants Treated with Penicillin and Sulphonamides, Lancet **252**:164 (Aug. 2) 1947. Birmingham, J. R., and Kaye, R.: Streptomycin in the Treatment of Influenzal Meningitis, J. Pediat. **29**:1 (July) 1946. Nussbaum, S.: Influenzal Meningitis: Report of 3 Cases Treated with Streptomycin and Sulfadiazine, ibid. **29**:14 (July) 1946. Yampolsky, J., and Jones, J. P.: Treatment of Influenzal Meningitis with Streptomycin and Sulfadiazine, J. M. A. Georgia **37**:379 (Oct.) 1948. Scherling, S. S., and Platou, E. S.: Acute Bacterial Meningitis, Lancet **69**:181 (May) 1949. Alexandria, H. E., and Leidy, G.: The Present Status of Treatment for Influenzal Meningitis, Am. J. Med. **2**:457 (Nov.) 1947.

2. Drake, M. E., and others: Aureomycin in the Treatment of Influenzal Meningitis, J. A. M. A. **142**:463 (Feb. 18) 1950. Bean, E. D., and Ross, S.: Haemophilus Influenzae Meningitis Treated with Aureomycin and Sulfadiazine, Clin. Proc. Child. Hosp. **6**:1 (Dec.) 1949. Chandler, C., and Hodes, H. L.: Aureomycin in the Treatment of Experimental and Clinical Infections with Haemophilus Influenzae, Am. J. Dis. Child. **79**:1132 (June) 1950. Long, P.: The Current Use of Antibiotics for the Control of Infections, Ann. Dent. **8**:101 (Dec.) 1949.

to have the most beneficial effect, it was decided to treat alternate patients with aureomycin alone and with aureomycin plus streptomycin and sulfonamides. The result of this study is reported in this paper.

METHOD OF STUDY

Eighteen patients with bacteriologically proved meningitis due to H. influenzae had treatment initiated with aureomycin [3] alone (hereafter referred to as the "aureomycin group"). For the first four patients the starting dose schedule was 25 mg. per kilogram for each 24-hour period, intravenously, but since this did not seem to give adequate results, the next 14 patients were given 50 mg. per kilogram intravenously during each 24-hour period. After one or two days of intravenous therapy, 12.5 mg. per kilogram was given by mouth at six-hour intervals. After 24 hours of combined oral and intravenous therapy, intravenous administration was stopped, and the patients continued with oral medication.

Fourteen patients (referred to hereafter as the "combination group") received similar doses of aureomycin (three according to the low-dose schedule and the remainder according to the high-dose schedule), in addition to streptomycin, 12.5 mg. per kilogram at six four-hour intervals, intramuscularly, and gantrisin® (a sulfonamide compound), 0.1 gm. per pound (0.2 gm. per kilogram) for each 24-hour period, intramuscularly in divided doses, following an initial dose of 0.05 gm. per pound (0.1 gm. per kilogram). As soon as practical, the gantrisin® was administered orally. After five days of therapy the streptomycin dose was decreased to 25 mg. per kilogram for each 24-hour period and was generally stopped by the 10th day of therapy. The above schedules were adhered to except for certain minor deviations, depending on the hour of admission of the patient, difficulties with drug administration, etc.

Because of the inadvisability of withholding therapy which may be beneficial from patients who are seriously ill, four of the patients in the aureomycin group who were not doing as well as expected were treated with other drugs late in the course of treatment. Three of these patients were receiving the low dose of aureomycin. Two of them were treated with streptomycin and gantrisin,® and one was treated with penicillin as the supplemental drug. One patient receiving the large dose of aureomycin was treated with streptomycin and gantrisin,® starting on the fourth hospital day. The symptomatic treatment of the two groups was essentially the same.

Whenever possible, a lumbar puncture was done on the second or third day of therapy so that a comparison of the laboratory findings could be made in the two groups. The procedure was repeated at weekly intervals until the cerebrospinal fluid white blood cell count was below 30 cells per cubic millimeter.

In infants whose fontanelles were not closed, any delays in response to therapy, particularly if associated with convulsions or focal neurologic signs or signs of intracranial hypertension, were investigated by subdural punctures. In older children, however, even though an occasional defervescence occurred by very slow lysis, there was no instance of neurologic findings of sufficient importance to warrant surgical procedure to determine the presence or absence of subdural fluid.

RESULTS

As can be seen from Table 1, the two groups were comparable with respect to age distribution, cerebrospinal fluid white blood cell count and dextrose content, and duration of disease before therapy was begun. While there was no demonstrably significant effect of any of these or other factors on the outcome, the table does show that the two groups are relatively unweighted.

In tabulating the results of treatment, the patients who received the smaller dose of aureomycin (25 mg. per kilogram per 24 hours) intravenously are included, since there was a similar proportion of such patients in each group. In none of the three patients in the multiple-drug group who received the lower dose was there pro-

3. The aureomycin used in this study was furnished by Lederle Laboratories of the American Cyanamid Company.

longed fever, pleocytosis spinalis, or intracranial complications. On the other hand, three of the four patients receiving aureomycin alone in doses of 25 mg. per kilogram every 24 hours were given streptomycin and gantrisin® or penicillin between the third and fifth day of treatment. It would appear that this dose of aureomycin is too small to be of maximum efficiency. On two occasions the cerebrospinal fluid was shown not to contain demonstrable amounts of aureomycin after three days of therapy with this low dose.

Examinations of cerebrospinal fluid were done on all but two patients on the second or third hospital day. In these fluids H. influenzae was demonstrated by smear on two occasions, by culture on one and by both methods on another. One of the patients with a positive smear and negative culture received aureomycin alone. The other three patients were in the combination group. One patient treated

TABLE 1.—*Age Distribution, Cerebrospinal Fluid, and Duration of Disease Before Treatment in Patients Treated with Aureomycin Alone and in Those Treated with Aureomycin, Streptomycin, and Gantrisin®*

	Aureomycin Group		Combination Group	
	No.	% of Total	No.	% of Total
Age group, mo.				
0 to 6	3	17	1	7
7 to 12	3	17	5	35
13 to 24	5	28	4	29
25 to 60	5	28	4	29
Over 60	2	10	..	..
Cerebrospinal fluid				
White blood cells, no.				
0 to 1,000	6	34	4	29
1,000 to 5,000	7	39	6	42
Over 5,000	5	27	4	29
Dextrose, mg./100 cc.				
Below 20	3	17	3	21
20 to 49	12	66	10	72
50 and over	3	17	1	7
Duration of disease before therapy, days				
Under 3	10	56	11	79
3 to 5	6	33	2	14
Over 5	2	11	1	7
Totals	18	100	14	100

with the low dose of aureomycin alone had negative cultures at the time the initial fluid was taken and on the second day but positive cultures on the fifth day. When penicillin was added to the therapeutic regimen, the patient recovered. Quantitative dextrose determinations were also done on these fluids, and in only one was it found to have remained below 50 mg. per 100 cc. This patient was receiving combination therapy.

As can be seen in Table 2, the fever was of shorter duration and the white blood cell count in the cerebrospinal fluid fell more rapidly when aureomycin was administered alone.

In making a statistical comparison it was necessary to omit from the figures the patients who received other antibiotics later in their course. To compensate for the removal of these figures, which were near the mean, the four poorest results were omitted from the combination group when the mean was computed. This actually weights the results somewhat in favor of the combination group, but, in spite of this, the mean for the duration of fever in the aureomycin group was 3.7 days and in the combination groups, 7.3 days. That this difference is significant is

shown by a t value of 3.8. Similarly the duration of a white blood cell count over 30 cu. mm. in the cerebrospinal fluid was 18.0 days in the "corrected" aureomycin group and 23.5 in the "corrected" combination group. The value for t was 2.8, which is of borderline significance.

In the entire group of patients there were two in whom subdural effusions developed. In both, the condition was relieved by repeated aspirations. One of these occurred in each group. In each group there was also one patient in whom a hemiplegia developed which has persisted. In addition, in one patient in the combination group a subdural effusion developed, as well as a spinal block, and the patient has, apparently, a permanently paralyzed lower extremity from spinal-cord damage. Two relapses occurred, one in each group, about one week after therapy

TABLE 2.—*Duration of Fever and Pleocytosis Spinalis in Patients Treated with Aureomycin and in Those Treated with Aureomycin, Streptomycin, and Gantrisin®*

	Aureomycin Group		Combination Group	
	No.	% of Total	No.	% of Total
Duration of fever above 100 F. rectally, days				
1 to 3	8	44	0	0
4 to 6	6*	33	4‖	28
7 to 9	3†	17	3‖	22
Over 9	1	6	7‖	50
Duration of white blood cell count over 30/cu. mm., days				
1 to 7	1	6	0	0
8 to 14	9	50	2‖	14
15 to 21	5‡	28	4‖	29
Over 21	3§	16	8‖	57
Complications				
Subdural effusion	1¶	..	1	..
Subdural effusion with spinal block	..	..	1	..
Hemiplegia with negative subdural puncture	1	..	1	..
Relapse	1	..	1	..

* One patient was treated with streptomycin and gantrisin® when response to aureomycin (50 mg. per kilogram per 24 hours) was delayed. Two patients were treated with streptomycin and gantrisin® when response to aureomycin (25 mg. per kilogram per 24 hours) was delayed.

† One patient was treated with streptomycin and gantrisin® when response to aureomycin (50 mg. per kilogram per 24 hours) was delayed. One received aureomycin in doses of 25 mg. per kilogram per 24 hours.

‡ One patient was treated with streptomycin and gantrisin® when response to aureomycin (50 mg. per kilogram per 24 hours) was delayed. One was treated with penicillin and two with streptomycin and gantrisin® when response to aureomycin (25 mg. per kilogram per 24 hours) was delayed.

§ One patient received aureomycin in doses of 25 mg. per kilogram per 24 hours.

‖ One patient was treated with streptomycin and gantrisin® when response to aureomycin (50 mg. per kilogram per 24 hours) was delayed.

was discontinued. In each of these there was a return of low-grade fever and a transitory increase in white blood cell count in the cerebrospinal fluid. Both responded well to further treatment. In neither was a positive culture obtained.

During the time this series was being collected two additional patients with H. influenzae meningitis were treated. For one, a 38-year-old woman who revealed no organism upon the initial smear, penicillin treatment was started in a dosage of 1,000,000 units every two hours, intramuscularly. By the time the culture was reported to be positive for H. influenzae, she was doing so well that therapy was completed with penicillin only. The second, a 2-year-old boy, was admitted in a moribund state with signs and cerebrospinal-fluid findings suggestive of encephalitis. He was treated empirically with aureomycin (25 mg. per kilogram every 24 hours intravenously), penicillin (1,000,000 units every two hours intramuscularly), and gantrisin® (2 gm. intravenously immediately plus 0.5 gm. every four hours). After his death, which occurred a few hours after admission, a blood culture revealed

H. influenzae. Cerebrospinal-fluid culture was negative. His death is the only one among the 34 patients treated, a fatality rate of 3%.

In evaluating the effect of penicillin on this type of infection, one patient in the aureomycin group should be considered. This 2-year-old patient was found to have meningitis of unknown origin. Because of the patient's age and the course of the disease, it was believed that she had an H. influenzae infection. She was accordingly treated with aureomycin, 25 mg. per kilogram every 24 hours intravenously. Because she was not doing well on the fifth day, and because there was a possibility that the etiologic agent might be a pneumococcus, 1,000,000 units of penicillin was administered every two hours. The cerebrospinal-fluid culture, which was negative on the initial and second day follow-up puncture, was positive on the one obtained just before penicillin therapy was begun. This specimen of cerebrospinal fluid showed no aureomycin activity when tested in vitro. The response to penicillin was prompt, and the patient recovered without further difficulty.

COMMENT

From the results obtained in this study, four points seem to be of considerable importance. First, when given in sufficient dose, aureomycin alone seems to give equally good or better results than aureomycin supplemented with streptomycin and gantrisin.® Second, when aureomycin is used alone, the dose should be at least 50 mg. per kilogram every 24 hours and early treatment should be by the intravenous route. Third, with the use of aureomycin, deaths from influenza bacillus meningitis should be uncommon, but there is still room for improvement in results as far as morbidity and permanent nervous-system damage is concerned. Fourth, penicillin when given in sufficient dose may be effective in some patients with H. influenzae meningitis.

Because it was deemed necessary to add other drugs to the treatment regimen in several instances, this does not constitute a rigidly controlled series. Whenever one is dealing with a potentially fatal disease it is practically impossible to withhold therapy which may be beneficial. In retrospect, it is apparent that there were more patients in the combination group who responded poorly to treatment than in the aureomycin group, but, since there was nothing else to add, no change in treatment was made. Moreover, even if the patients in the combination group whose course was the most unsatisfactory are omitted in order to counterbalance the patients in the aureomycin group who were given other therapeutic agents because they did not respond promptly to aureomycin, a comparison of the remaining patients in the groups reveals that aureomycin alone is somewhat superior to aureomycin combined with streptomycin and gantrisin,® when rapidity of recovery and incidence of complications are considered. It would seem perfectly safe to use aureomycin alone in treating any patient with H. influenzae meningitis. If, for some reason, response is not satisfactory after 24 to 48 hours, the other drugs can still be added, although it would appear that they would not contribute anything to recovery.

Three of four patients who received other antibiotics because they had responded poorly with aureomycin alone had received only 25 mg. per kilogram of aureomycin per 24-hour period. In several of the patients who were given additional therapeutic agents later in the course, cerebrospinal-fluid assay failed to reveal aureomycin activity after several days of treatment and before therapy was changed.

When a dose of 50 mg. per kilogram per 24 hours was used the results were more satisfactory, and this would appear to be the optimal therapeutic regimen when the intravenous route is used. It has been our experience that early high concentrations of antibacterial agents are most important in treatment of any type of meningitis. For this reason, intravenous administration is most important in order to obtain promptly a high serum concentration and penetration into the cerebrospinal fluid. Experience with several patients treated exclusively by the oral route has indicated that it is a less desirable method.

The principal problems in the treatment of influenza bacillus meningitis are not only whether the patient survives or not but also how sound a person results. As seen in this series, there are a moderate number of patients who have permanent neurologic sequelae. Our therapeutic goal should be to find a method of minimizing these complications. Certainly, early diagnosis of the illness and adequate treatment seem most important in this regard. Moreover, prompt recognition of collections of fluid in the subdural space and their drainage may help decrease permanent damage. In addition, each new antibiotic or agent which shows promise should be tried and compared with the existing drugs.

That penicillin in large doses should be effective in the treatment of H. influenzae meningitis might be predicted from the in vitro sensitivity of the organism. We do not feel that it is the drug of choice or likely to become so, but it is reassuring to know that in large doses it may be effective. The masking effect of smaller doses of penicillin upon the course of the disease is also of clinical importance.

SUMMARY

Eighteen patients with meningitis due to Hemophilus influenzae have been treated with aureomycin alone and 14 with a combination of aureomycin, streptomycin, and gantrisin® (a sulfonamide compound). None of these patients died.

When aureomycin was used in doses of 50 mg. per kilogram every 24 hours intravenously, results were as good, as far as duration of fever, pleocytosis spinalis, and complications are concerned, as when the combination was used.

In two patients penicillin in doses of 1,000,000 units intramuscularly every two hours was used with success. One patient, not in these series, who had the encephalitic form of the disease, died in spite of treatment with aureomycin, penicillin, and gantrisin.®

Three patients with subdural effusions were successfully treated by repeated aspiration.

It is concluded that aureomycin used alone is a successful form of therapy in meningitis due to H. influenzae and that no additional advantage is gained by using streptomycin and gantrisin® in addition.

808 S. Wood St. (12).

Case Reports

ANOMALOUS ORIGIN OF LEFT CORONARY ARTERY

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AND
R. R. ROCHAT, M.D.
BUSSUM, NETHERLANDS

ANOMALOUS origin of the coronary arteries is a congenital anomaly which is found relatively infrequently.[1] Only four cases were noted among 6,800 autopsies at the Massachusetts General Hospital (Bland, White, Garland), while Abbott [2] found the condition in 10 of 1,000 patients with congenital heart disease. Soloff [3] (1942) reviewed the cases of anomalous origin in the medical literature and added 1 case to the 16 that he found in which the left coronary artery originated from the pulmonary artery. He found two cases in which the right coronary artery originated from the pulmonary artery, and two other cases in which both coronary arteries arose from the pulmonary arteries. Other types of anomalous coronary vessels are very rare, such as both coronary vessels arising from the aorta, the accessory coronary vessels arising from elsewhere, and only one coronary artery supplying branches of both the left and the right ventricles.

Besides the pathological and embryological interest of these cases, it is important for general practitioners to know that the diagnosis can be made during life, and therefore there is a greater possibility that patients can be treated successfully. We found one case mentioned by Eidlow and Mackenzie [4] in which the diagnosis had been made during life; therefore, our case seems to be important.

REPORT OF A CASE

G. S. was the second child of healthy parents whose first child showed no abnormalities. The pregnancy was normal during the first months; afterwards blood pressure rose and was treated by means of low-salt diet. The mother did not have any infectious disease during the first months of pregnancy and never had a miscarriage.

1. Taussig, H. B.: Congenital Malformations of the Heart, London, Commonwealth Fund, 1947, p. 320. Linck, K.: Aneurysmatische Erweiterung der linken Herzkammer infolge Ursprungs der linken Kranzschlagader aus der Pulmonalis bei einem 8 Monate alten Mädchen, Virchow's Arch. path. Anat. **297**:113-118, 1936. Lyon, R. A.; Johansmann, R. J., and Dodd, K.: Anomalous Origin of the Left Coronary Artery, Am. J. Dis. Child **72**:675-690 (Dec.) 1946. Dietrich, W.: Ursprung der vorderen Kranzarterie aus der Lungenschlagader mit ungewöhnlichen Veränderungen des Herzmuskels und der Gefässwande, Virchow's Arch. path. Anat. **303**:436-456, 1939.

2. Abbott, M. E.: Congenital Heart Disease, in Nelson's Loose Leaf Living Medicine, New York, Thomas Nelson & Sons, 1931, Vol. 4, p. 207.

3. Soloff, L. A.: Anomalous Coronary Arteries Arising from Pulmonary Artery: Report of a Case in Which Left Common Artery Arose from Pulmonary Artery, Am. Heart J. **24**:118-127 (July) 1942.

4. Eidlow, S., and Mackenzie, E. R.: Anomalous Origin of Left Coronary Artery from Pulmonary Artery: Report of Case Diagnosed Clinically and Confirmed by Necropsy, Am. Heart J. **32**:243-249 (Aug.) 1946.

Parturition was absolutely normal, and the boy, with birth weight of 3,250 gm., cried lustily and never presented cyanosis. The mother tried to nurse him, but she found him short of breath before feedings and more so after feedings. According to her, the child avoided drinking as much as he could because of shortness of breath. When the baby did not thrive normally, the mother started feeding him cow's milk mixtures, protein milk, and lactic acid milk, all without success. Increase in weight was decidedly insufficient, principally because of insufficient feedings. The mother, an intelligent woman, told us that she did not believe that real anorexia existed but, rather, thought that the child could take only small meals because of dyspnea and attacks of pain and discomfort.

We saw the baby in consultation at the age of 4 months when he had a body weight of 5,000 gm. He was dyspneic even at rest; the respiratory rate was 60 to 80 a minute, without cyanosis. The finger and toe tips were normal. When the baby was fed the respirations were faster, after a few minutes he was screaming with discomfort, the complexion was pale, and beads of perspiration appeared on the forehead. The pulse was fast and almost imperceptible; the condition was like that of a child on the point of collapse. After 10 or more minutes the complexion lost its paleness, and the child seemed more comfortable.

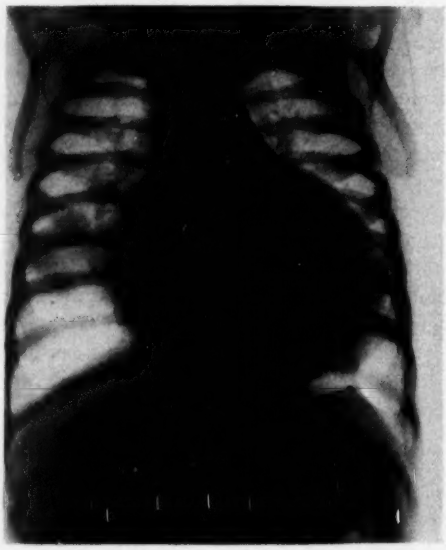

Fig. 1.—Impression of low-lying diaphragm confirmed on roentgenogram by presence of emphysema and enormous enlargement of the heart shadow.

The chest presented a real cardiac voussure, and on percussion we found distinct enlargement of the heart to the left, with normal though weak heart sounds. The apex was more than 1.5 cm. outside the left nipple line. The diaphragm was low on both sides. The abdomen lacked the normal prominence; the liver was not enlarged, nor was the spleen. Edema was not present in the legs.

A roentgenogram of the chest confirmed the impression of low-lying diaphragm by showing the presence of emphysema and an enormous enlargement of the heart shadow (Fig. 1), especially of the left ventricle. The vessel trunk seemed rather small, but when the patient was turned the size remained the same.

The electrocardiographic findings (Fig. 2) were as follows: in lead I, a negative T wave and a notch in the QRS complex; in lead II, a notch in the QRS complex and a slight indication of alternans of the heart; in lead III, a positive T wave and an M formed on the QRS complex

with low voltage. Electrocardiographic study repeated some days before death showed the T wave to be negative in leads I, II, and III.

The results of a blood study were as follows: a negative Wassermann reaction, 11.8 gm. of hemoglobin, 3,720,000 red blood cells, and 8,800 white blood cells, with 1% eosinophiles, 2% basophiles, 3% stab forms, 32% polymorphonuclear leucocytes, 59% lymphocytes, and 3% monocytes.

A diagnosis of congenital heart disease was made, and on the basis of the history, i. e., dyspnea without cyanosis or drumstick fingers and toes, attacks of pain during and after meals, the fact that he began life as a normal infant, and megalocardia with typical electrocardiographic findings, we diagnosed the condition as anomalous left coronary artery arising from the pulmonary artery.

We tried to feed the baby concentrated meals and put him into an oxygen tent. The attacks of pain could be managed only by means of morphine. At the end of 10 days the child collapsed after being fed and died. Permission for partial autopsy was given.

Postmortem Examination.—When the chest was opened, the lungs were found to be atelectatic in the upper parts and emphysematous in the lower lobes. In the pleural cavities 10 cc. of straw-yellow fluid was present. In the pericardial cavity there was the same quantity of fluid.

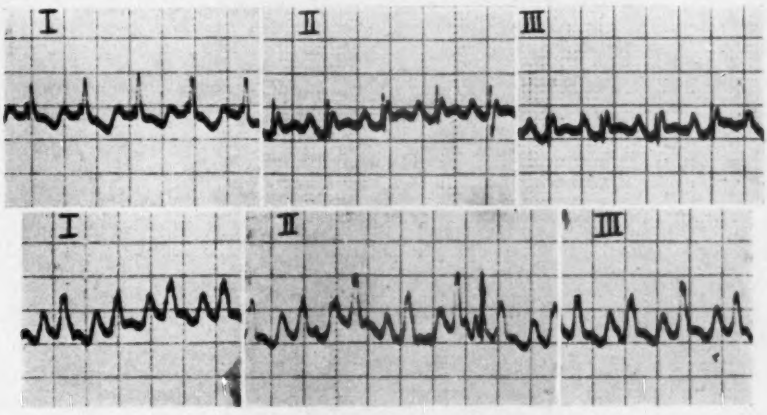

Fig. 2.—Electrocardiographic results; above, early in study; below, a few days before death.

The pericardium was glistening. The heart was very much enlarged, being four times as big as the baby's fist, and it was especially enlarged to the left. The apex was formed by the left ventricle, and near the apex at the front side of the left ventricle we saw a dimpling of the surface caused by thinning of the muscular wall.

One of us (R. R. R.) made a study of the heart structure, and made the following observations. The heart was very large, weighing 120 gm. instead of the normal 30 gm. The enlargement was mainly of the left ventricle which formed the apex. The whole surface of the heart glistened. Near the apex there was a distinct dimpling, about the size of a Dutch florin (about 2.5 cm.) purple-colored, and somewhat atrophic. The aorta and the pulmonary arteries and their branches were completely normal in place, development, and course. The ductus arteriosus was obliterated (Fig. 3).

The left ventricle was extremely enlarged, and the interventricular septum had been pushed to the right, with the result that it was bulging into the right ventricle. When a section was made perpendicularly on the long axis of the right ventricle, a sickle-like appearance was seen. The wall of the left ventricle measured 10 mm. and was purplish-brown. On the inner side the trabeculae were very distinct, even in the thinnest part of the left ventricle; between these trabeculae the wall was paper-thin and transparent. The papillary muscles were flattened. The right ventricle presented only slight enlargement. The wall measures 8 mm.; the trabeculae were

distinctly visible, and the papillary muscles were flattened. The conus arteriosus had been pushed upward and to the right. The atria were normal in size and structure; the foramen ovale was closed. Nowhere in the heart were thrombi found.

Inspection of the valves revealed normal structure, place, and arrangement. The right coronary artery originated from the normal place in the right aortic sinus and presented a normal course. The left coronary artery arose from the left aortic sinus, dividing shortly afterward into circumflex and descending branches, both with a normal localization. The walls were thin and the lumina empty.

Microscopic examination showed that the thinnest part of the left ventricle had a curious structure. The epicardium was slightly thickened and contained wide blood vessels. Just beneath the epicardium a small zone of normal heart muscle tissue could be seen, but on the side of the heart cavities the muscle was sponge-like, with an abundance of blood cavities lined with endothelium. Beneath the endocardium these blood-containing cavities were numerous and larger, sometimes communicating with the ventricular cavity. Muscle tissue in the atrophic part of the wall of the left ventricle had been replaced by fibrous tissue; in the transitional part the muscle fibers presented vacuolar degeneration and atrophy, with increasing interstitial fibrous tissue and slight calcification.

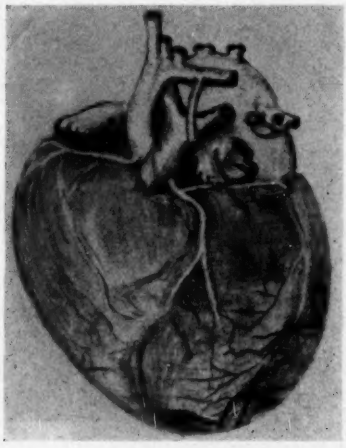

Fig. 3.—Diagram of heart findings.

The pathologist's diagnoses were anomalous origin of the left coronary artery from the pulmonary artery; enormous hypertrophy of the wall of the left ventricle, partly dependent upon the development of sponge-like tissue communicating with the heart lumina; atrophy; fibrosis, and calcification of the myocardium.

COMMENT

In view of the rather rare occurrence of anomalies of the coronary arteries, correct diagnosis made during life must be considered real progress. It is very important to realize that a diagnosis by means of common clinical methods is quite possible. Modern arteriography has been successful only in experiments on dogs in the studies of Pearl, Friedman, Gray, and Friedman,[5] who succeeded in photographing the coronary vessels of dogs with intact chests by a method of retrograde aortography.

5. Pearl, F.: Friedman, M.; Gray, N., and Friedman, B.: Coronary Artiography in Intact Dogs, Circulation **1**:1188-1192 (May) 1950

Embryology.—It is surprising that in textbooks on embryology information on formation and anlage of the coronary arteries is lacking. The general idea seems to be that these arteries arise as buds on the common arterial trunk before the division into aorta and pulmonary artery occurs. In the pig embryo (Bennett [6]), the coronary vessels arise as massive angioblastic strings, later becoming canalized. In 10-mm. rabbit embryos the same budding of coronary vessels can be found. The arterial rudiments are at first solid and later become canalized, growing into the superficial layers of the myocardium and joining capillary vessels and intratrabecular cavities from the developing myocardium (Grant [7]). It seems rather improbable that deflection of the dividing wall in the common arterial trunk causes the anomalous origin of the coronary vessels when one studies the normal location, measurements, and development of cusps in aorta and pulmonary artery.

Pathology.—The changes found in the heart when the left coronary artery arises from the pulmonary artery seem easy to understand. After birth the left ventricle is supplied by venous blood only, causing hypoxic changes in the muscle fibers. A correction of the faulty circulation in the heart muscles is made by a richly developed capillary network and the subendocardial spongy tissue communicating with the heart cavities. This spongy mass is partly responsible for the hypertrophy of the left ventricle. The symptoms in anomaly of the left coronary artery have a vivid resemblance to those of coronary occlusion in adults.

Prognosis.—The prognosis seems rather bad; most patients die before the age of 13 months. Only four patients are known to have lived longer; they have died between 27 and 64 years of age. The cardiac failure caused by repeated attacks of angina pectoris with fibrosis of the myocardium and thinning of the wall, which can lead to heart rupture, cannot, up to the present time, be avoided successfully.

Therapy.—In order to correct blood circulation in the heart muscle, we must try to enrich the blood with oxygen and to force highly oxygenated blood into the left coronary artery. If by an anastomosis between aorta and pulmonary artery it is possible to create an increasing pressure in the pulmonary artery, oxygenated blood should be pressed into the coronary artery.

An amelioration in blood circulation of the heart muscle may be instituted by cardio-omentopexia or by using the left pectoral muscle. Experimental attempts to use a ramus of the internal mammary artery which leads into the myocardium may give rise to new anastomoses and improvement of the heart circulation. We cannot deny that the artificial heart constructed by Jongbloed may enable surgeons to undertake more operations for congenital heart anomalies. This success, combined with the possibility of diagnosing correctly the anomalous origin of the left coronary artery, may perhaps lead to a more successful treatment than now exists.

SUMMARY

A 4-month-old baby suffered from an anomalous origin of the left coronary artery from the pulmonary artery. The condition was diagnosed during life and confirmed by partial necropsy.

6. Bennett, H. S.: Development of Blood Supply to Heart in Embryo Pig, Am. J. Anat. **60**:27-53 (Nov.) 1936.

7. Grant, R. T.: Development of Cardiac Coronary Vessels in Rabbits, Heart **13**:261-271 (Dec.) 1926.

ORIGIN OF THE LEFT CORONARY ARTERY FROM THE PULMONARY ARTERY

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MEDICAL CORPS, ARMY OF THE UNITED STATES
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D. JOE FREEMAN, B.S.
MADISON, WIS.

THE LEFT coronary artery arising from the pulmonary artery represents a rare anomaly which until 1933 was not diagnosed clinically.[1] Abrikosoff[2] reported the first case in 1911. In 1946 Kaunitz[3] found 27 cases in the literature and added 2 of his own. In 1949 Gasul and Loeffler[4] collected 22 cases in the literature and reported 4 additional cases. Since then four more cases have been described.[5]

Patients with this anomaly usually do not survive the first year of life, although a few have lived to adulthood. In infancy a distinctive picture may be recognized. It is characterized by progressive dyspnea, apparent pain and symptoms of shock after feeding, and progressive cardiac enlargement and failure. Cyanosis, clubbing, cardiac murmurs, and thrills are absent. The electrocardiogram shows inversion of T waves, usually in all three limb leads, and low voltage. Roentgenograms and fluoroscopy reveal conspicuous cardiac enlargement, primarily to the left.

It is the purpose of this paper to report another case of this rare cardiac anomaly occurring in a 4-month-old girl in whom the electrocardiographic findings were somewhat unusual. The clinical picture was characteristic enough to permit premortal diagnosis.

REPORT OF A CASE

B. L. W., a white girl, born Sept. 21, 1950, was admitted to the pediatric service of the State of Wisconsin General Hospital on Jan. 1, 1951, at the age of 3½ months. The mother was a

From the Departments of Pediatrics and Pathology, University of Wisconsin Medical School, and State of Wisconsin General Hospital.

1. Bland, E. F.; White, P. D., and Garland, J.: Congenital Anomalies of the Coronary Arteries: Report of an Unusual Case Associated with Cardiac Hypertrophy, Am. Heart J. **8**:787, 1933.

2. Abrikosoff, A.: Aneurysma des linken Herzventrikels mit abnormer Abgangstelle der linken Koronararterie von der Pulmonalis bei einem fünfmonatlichen Kinde, Virchow's Arch. path. Anat. **203**:413, 1911.

3. Kaunitz, P. E.: Origin of Left Coronary Artery from Pulmonary Artery: Review of the Literature and Report of 2 Cases, Am. Heart J. **33**:182, 1947.

4. Gasul, B. J., and Loeffler, E.: Anomalous Origin of the Left Coronary Artery from the Pulmonary Artery (Bland-White-Garland Syndrome): Report of 4 Cases, Pediatrics **4**:498, 1949.

5. Gouley, B. A.: Anomalous Left Coronary Artery Arising from the Pulmonary Artery (Adult Type), Am. Heart J. **40**:30, 1950. de Chastonay, E., and Buser, M.: Über einen Fall von Abgang der Arteria coronaria sinistra aus der Arteria pulmonalis, Helvet. paediat. acta **4**:308, 1949. Dutra, F. R.: Anomalies of Coronary Arteries: Report of 2 cases, with Comment on Dynamics of Development of Coronary Circulation, Arch. Int. Med. **85**:955, 1950.

primigravida primipara. The pregnancy was uneventful and full-term. Labor lasted five hours; delivery was by forceps. There was no cyanosis. The infant's birth weight was 2,100 gm. Physical examination at birth revealed no abnormalities. At the age of 2 months, examination by the local physician did not disclose any abnormalities. The parents felt that the patient's respirations had always been rapid and that she never rested well. Several formula changes were instituted, and the patient was examined again by the local physician at the age of 2½ months because of restlessness, irritability, slight cough, and gagging and vomiting after feedings. Decreased resonance and breath sounds over the left side of the chest were detected on physical examination. Roentgenography and fluoroscopy at that time revealed a markedly enlarged heart. Additional information obtained at the time of admission to the hospital was that dyspnea was especially marked after feedings and somewhat relieved when the child was in the sitting position.

Physical examination revealed a somewhat pale, well-developed, well-nourished white girl, weighing 5,000 gm. There was no cyanosis. Respirations were rapid and slightly irregular.

Fig. 1.—Chest roentgenogram 15 days prior to death, showing cardiac enlargement, mainly to the left, and the heart filling much of left thorax.

Breath sounds over the left lower posterior part of the chest were decreased. The heart was enlarged to the left to percussion; no murmurs, arrhythmias, or thrills were noted. Femoral pulsations were good. The patient remained in the hospital for five days, during which time she was dyspneic and irritable, ate poorly, and was never noted to be cyanotic.

The results of urinalysis were normal. The hemoglobin was 11.75 gm. per 100 cc., and the red blood cell count was 3,750,000. The white cell count was 7,500, with 31% filamented neutrophiles, 1% nonfilamented neutrophiles, 63% lymphocytes, and 5% monocytes. The blood sugar was 104 mg. per 100 cc. Reactions to serologic tests were negative, as were a perianal smear and nose and throat cultures.

A chest roentgenogram and fluoroscopy showed a grossly enlarged heart with enlargement mainly to the left and filling much of the left thorax. The silhouette was largely globular, and there was poor differentiation of the various cardiac chambers. The esophogram was normal.

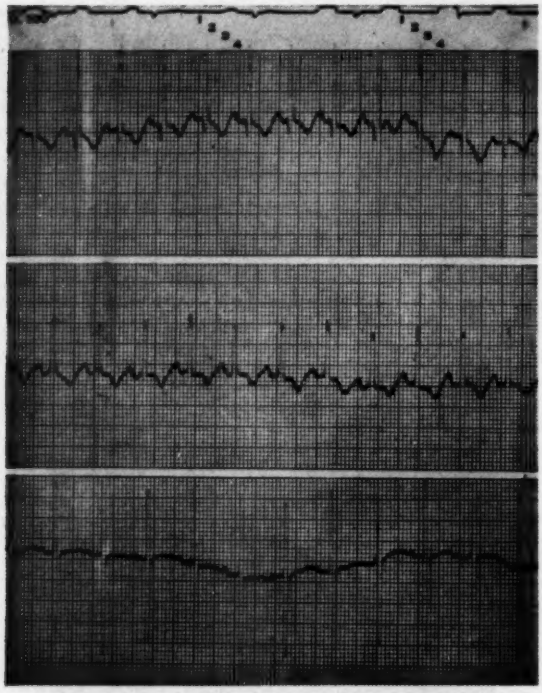

Fig. 2.—Electrocardiogram two weeks prior to death, showing tendency to left-axis deviation, high voltage in lead III, inversion of T_1 and T_2, and inconstantly diphasic T_3.

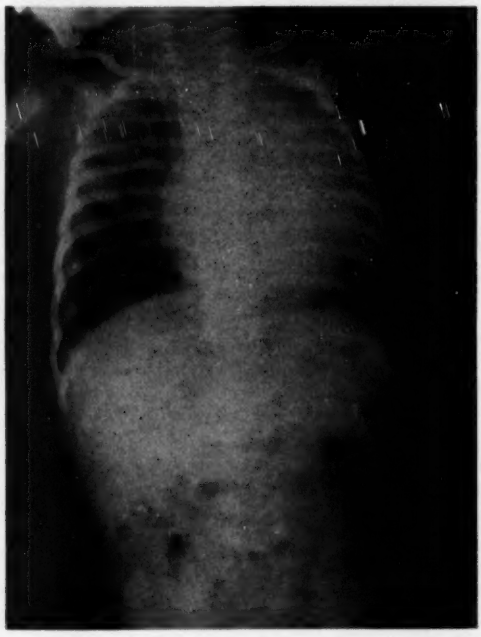

Fig. 3.—Chest roentgenogram one day prior to death, showing again marked cardiac enlargement.

The left hilum was obscured by the heart. On the right side there was some increase in vascular shadows forming the hilum, but the increase was slight. The periphery of the right lung and the left lung was clear. The central lung field was hidden by the heart. The conclusion was generalized cardiac enlargement without evident cause (Fig. 1). The electrocardiogram showed first-stage atrioventricular block, rate 135 to 145, a tendency toward left axis deviation, lead III having high voltage in the QRS complexes, the T waves inverted in leads I and II, the T wave inconstantly diphasic in lead III, a P-R interval of 0.14 seconds, and a Q-R interval of 0.06 seconds. The impression was congenital cardiac anomaly and interference with the coronary circulation (Fig. 2).

The patient was readmitted to the State of Wisconsin General Hospital on Jan. 24, 1951, ten days after the original admission. In the meantime, she had been taken to another hospital

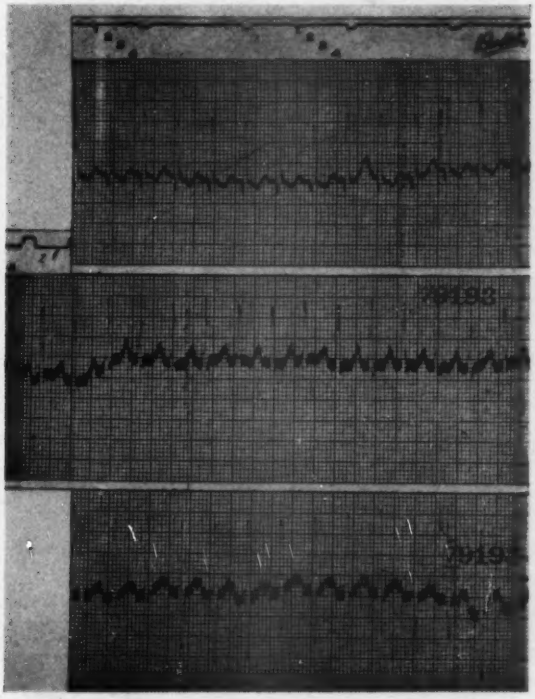

Fig. 4.—Electrocardiogram one day prior to death. Note upright T_2 and T_3.

where treatment with digitalis was started. Dyspnea had become more intense. Physical examination was essentially as before. Rectal temperature was 104 F., breathing was very rapid and shallow, and the rate was 78. Pallor was noted but not cyanosis. Again decreased breath sounds over the entire left chest area and marked cardiac enlargement were found. A questionable soft, grade-I systolic murmur was heard over the apex; heart tones were quite distant. The liver was palpable 2 fingerbreadths below the right costal margin. Dyspnea and restlessness increased, and the patient died on the following day.

The hemoglobin was 12.7 gm. per 100 cc., the red blood cell count was 4,760,000, and the white blood cell count was 8,750, with 33% filamented neutrophiles, 2% nonfilamented neutrophiles, 50% lymphocytes, 13% monocytes, 1% eosinophiles, and 1% basophiles.

A chest roentgenogram again showed a large heart which had not changed appreciably during the interim. It remained greatly enlarged, filling most of the left thorax. There continued to be

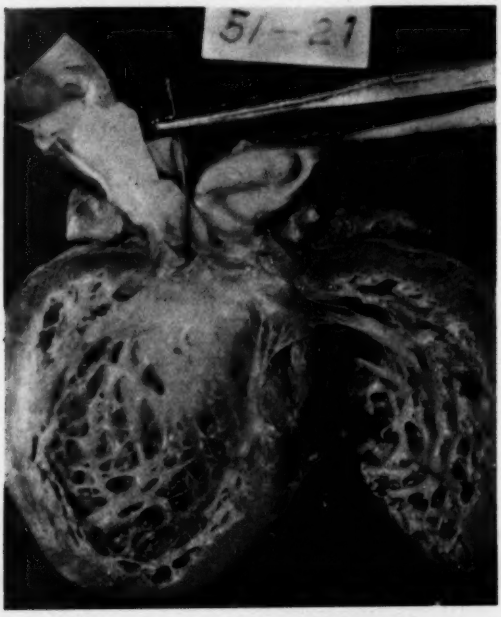

Fig. 5.—Photograph of heart, showing left ventricular dilatation, hypertrophy, and endocardial fibrosis; probe in ostium of right coronary artery with anomalous fold of tissue above.

Fig. 6.—Photograph of heart, showing probe in one of ostia of the left coronary artery arising from the left posterior pulmonary sinus.

an increase in the pulmonary vessel shadows in the right lung (Fig. 3). The electrocardiogram showed upright T waves in leads II and III as the most significant change. The impression was that this paradoxical change in T waves was attributable to progressive coronary insufficiency (Fig. 4).

Autopsy Findings.—The autopsy was confined to the thorax.

Gross Description: Heart: The pericardial cavity contained a small amount of clear, straw-colored fluid. The heart was markedly enlarged to the left; the superficial vessels were dilated and prominent. It weighed 58 gm. Valvular measurements were as follows: tricuspid, 4.6 cm.; pulmonary, 3.1 cm.; mitral, 4.4 cm., and aortic, 3 cm. Thickness of the right ventricular wall was 3 mm., of the left ventricular wall, 8 mm. The leaflets were essentially normal. The myocardium was soft and pale red-brown. The wall of the left ventricle was hypertrophied and the chamber greatly dilated (Fig. 5). The endocardium of both ventricles was diffusely thickened

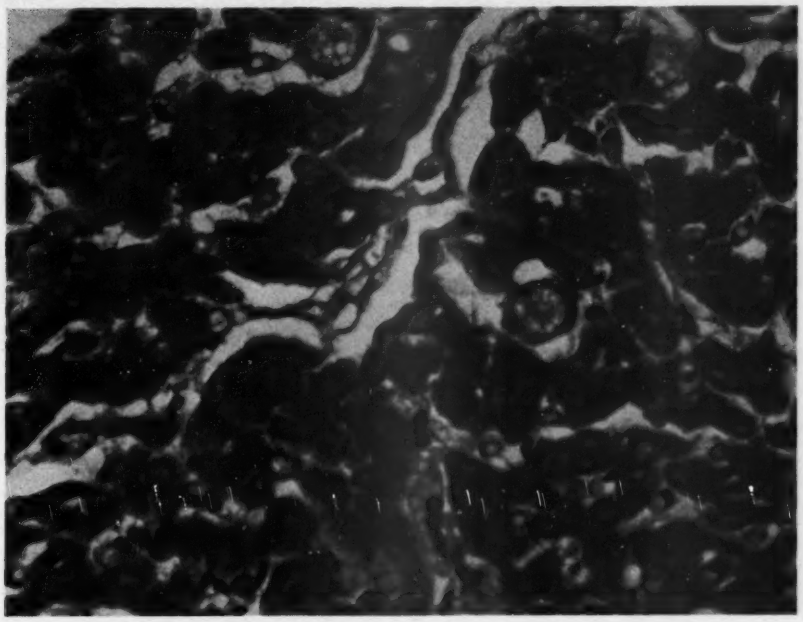

Fig. 7.—Photomicrograph of myocardium of left ventricle, showing marked congestion; × 100.

and gray-white, most conspicuously on the left. There were several openings from the ventricular chambers, especially the right, through which a probe could be passed directly into the myocardium. These probably represented vessels of the thebesian circulation. The foramen ovale was not patent.

Coronary Arteries: The left coronary artery had two orifices that arose from the lateral portion of the left posterior pulmonary sinus (Fig. 6). The larger ostium led into the anterior descending branch of this artery, which coursed down the anterior aspect of the interventricular septum to the apex; the smaller ostium led into the left circumflex branch which supplied about one third of the anterolateral superior wall of the left ventricle. The right coronary artery arose from the medial portion of the anterior aortic sinus and supplied the posterior aspect of the interventricular septum, almost the entire right ventricle and the remaining two-thirds of the left ventricle extending as far as the apex. There was a transverse, irregular fold of tissue traversing the superior anterior portion of this anterior sinus and overlapping the coronary

ostia (Fig. 5). The aorta was not remarkable, and the ductus arteriosus was completely obliterated.

Lungs: The lungs were congested.

Microscopic Description: Several sections from the left ventricular wall showed considerable separation of the muscle fibers into bundles. The vascular channels and minute capillaries between the individual muscle fibers were unusually prominent and apparently increased in number (Figs. 7 and 8). The fibers in some areas were hypertrophied, many with varying degrees of degeneration in the form of vacuolization and separation of myofibrils. In some of the fibers there was loss of striations and pyknotic nuclei. The endocardium was greatly thickened in all sections. Just beneath it were large, thin-walled vascular channels that extended for a considerable distance into the myocardium; these probably represented the vessels of the thebesian circulation.

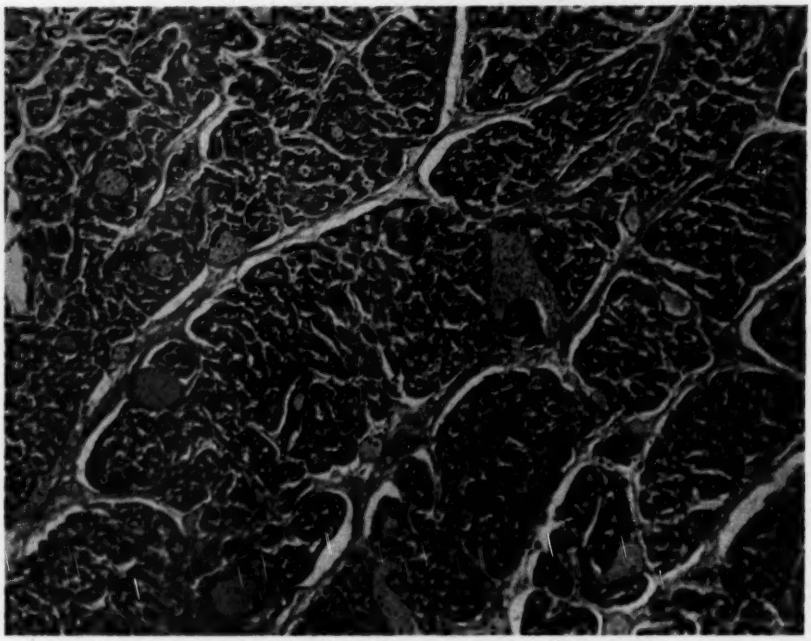

Fig. 8.—Photomicrograph of congested area, showing an apparent increase in the number of capillaries; × 500.

Diagnoses: The diagnoses were anomalous origin of the left coronary artery from the left posterior sinus of the pulmonary artery; dilatation and hypertrophy of the left ventricle; endocardial fibrosis; congestion of the myocardium and the lungs; vacuolar (hydropic) degeneration of the myocardium, and an anomalous fold of tissue in the anterior aortic sinus of Valsalva.

COMMENT

Attention is drawn to the electrocardiographic findings in this case. Low voltage and inversion of the T waves in all three leads and no axis deviation are the usual findings. In this case there was normal voltage, inversion of the T waves in leads I and II only, with the T waves inconstantly diphasic in lead III, and a tendency to left axis deviation. Another interesting feature was the turning upright of the

T waves in leads II and III one day before the patient's death. This paradoxical change may be attributed to progressive coronary insufficiency, as described by Masters.[6]

SUMMARY

A case of anomalous origin of the left coronary artery arising from the pulmonary artery in a 4-month-old girl is presented. Clinical and laboratory findings which permitted premortal establishment of the diagnosis have been described. Attention has been drawn to the electrocardiographic findings which, although not quite classic for this anomaly, were suggestive enough to strengthen the clinical impression. Autopsy findings are presented.

NOTE.—Since preparation of this article, McKinley has reported three additional cases of the left coronary artery originating from the pulmonary artery.[7]

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Dr. H. H. Shapiro, Department of Cardiology, University of Wisconsin Medical School, assisted in the study of this case.

6. Masters, A. M.: Symposium on Cardiovascular Diseases: The "2-Step" Exercise and Anoxemia Tests, M. Clin. North America **34**:704, 1950.

7. McKinley, H. I.; Andrews, J., and Neill, C. A.: Left Coronary Artery from the Pulmonary Artery: Three Cases, One with Cardiac Tamponade, Pediatrics **8**:828, 1951.

NEUROBLASTOMA WITH SKELETAL METASTASES AND APPARENT RECOVERY

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SEATTLE

NEUROBLASTOMA is a malignant tumor primarily of infancy and early childhood. Ordinarily this tumor grows rapidly, metastasizes widely and early, and is soon fatal. The average duration of life after diagnosis is less than six months. The tumor grows from cells tracing their origin to the primitive neural crest of the ectoderm and therefore is said to be neurogenic in origin. Commonly the site of the original tumor is the medulla of the adrenal gland which is derivative of the neural crest. Less often the tumor arises in sympathetic tissue elsewhere in the body.

That this tumor is not or need not be invariably fatal is well shown in the most recent review of the literature on this subject by Beck and Howard.[1] In their review they found 475 cases reported, with 47, or 10%, recorded as cures. This is probably not an accurate over-all picture, because the disease is not rare and no doubt the majority of cases are never reported. Since recovery is not expected, however, it can be assumed that those recoveries that do occur arouse enthusiasm. It is probable, consequently, that most recoveries are reported.

The majority of those patients who have been reported as cured in recent years have had complete or partial surgical excision of the original tumor and/or x-ray therapy. A comprehensive report on the methods of x-ray therapy was published in 1950 by Wittenborg[2] of the Children's Medical Center, Boston. This was the largest single experience to be reported thus far. The report reviews the cases of 73 patients, with 22 surviving three or more years. Of this group, however, there were no survivals in cases in which there were skeletal metastases. With one exception, there have been no reports of recovery in the presence of skeletal metastases. This exception was reported by Goldring in 1951.[3] The patient had an inoperable abdominal tumor, with definite spread to the liver, and probable metastatic involvement of the skeletal system, as demonstrated by roentgenograms. The child received x-ray treatment to the site of the tumor and liver involvement, and he recovered. The apparent skeletal involvement seemingly disappeared spontaneously.

What constitutes a "cure" in this disease is an unsettled question. A statement by Dr. George M. Wyatt[4] is pertinent.

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1. Beck, S. M., Jr., and Howard, P. J.: Neuroblastoma: Review of the Literature and Report of 6-Year Cure by Roentgen Therapy, A. M. A. Am. J. Dis. Child. **82**:325 (Sept.) 1951.

2. Wittenborg, M. H.: Roentgen Therapy in Neuroblastoma: Review of 73 Cases, Radiology **54**:679 (May) 1950.

3. Goldring, David: Neuroblastoma Sympatheticum with Metastases: Report of Case with Apparent Recovery, J. Pediat. **38**:231 (Feb.) 1951.

4. Wyatt, G. M., and Farber, S.: Neuroblastoma Sympathicum: Roentgenological Appearances and Radiation Treatment, Am. J. Roentgenol. **46**:485 (Oct.) 1941.

We have considered a one year survival from childhood neuroblastoma equivalent to a five year survival from the average adult cancer. In our series, no recurrences were found among those patients who were symptom free after one year.

In the case which is being reported here the patient had no x-ray treatment. Shortly after what seemed to be complete removal of the tumor, painful and progressively destructive lesions of both femurs developed in the child. This was diagnosed as metastatic neuroblastoma. It would be difficult logically to offer any other

Fig. 1.—Roentgenograms taken May 15, 1950, one week postoperatively, when bony structure was believed to be normal.

explanation of what was occurring in these femurs. Because of the historic futility of x-ray treatment for skeletal lesions, none was advised. As will be noted in the case history, the child was treated with a course of corticotropin (ACTH). In justification of this treatment, it can be said that no other definitive treatment was available and the least such treatment might do would be to relieve the child of some pain. No effort will be made to draw conclusions as to what part the corticotropin treatment played in the change which took place in this child. Nevertheless, it is felt that the case is noteworthy and should be reported.

Fig. 2.—Roentgenogram taken June 20, 1950, showing definite pathology in the right femur.

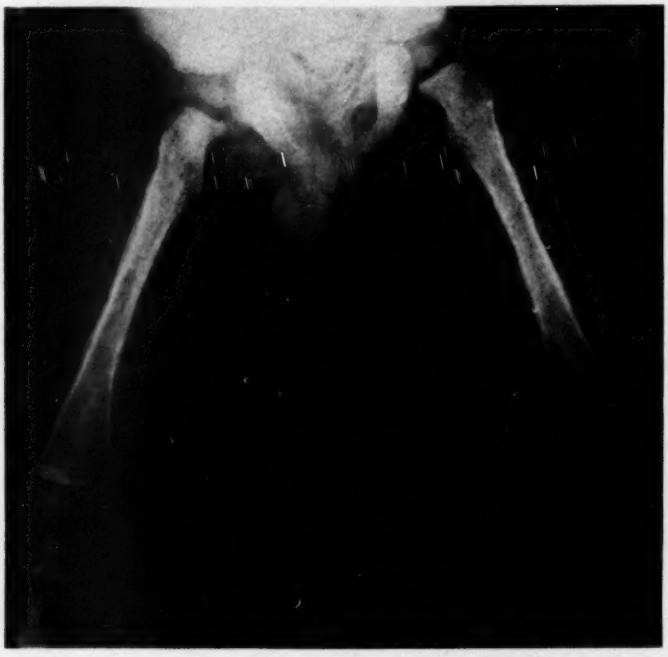


Fig. 3.—Roentgenogram taken Aug. 14, 1950, showing marked advance of the destructive process of the right femur and the left femur now rather badly riddled with metastatic disease.

REPORT OF A CASE

G. C., a boy infant, was born Oct. 8, 1949, weighing 7 lb. 14 oz. (3,600 gm.). The child was born at term of a first pregnancy. The pregnancy and delivery were uneventful. The baby developed normally and presented no problems.

On May 8, 1950, at the age of 7 months, the child had no complaints, was 27½ in. (70 cm.) long, and weighed 18 lb. 6 oz. (8,300 gm.). Upon physical examination the child was found to have a large, well-circumscribed mass in the left upper abdomen. It was felt that this was a tumor, probably a Wilms tumor. The child was operated upon on May 9, at Children's Ortho-

Fig. 4.—Roentgenogram taken July 31, 1951, when child had been clinically well for some months, showing normal bone structure.

pedic Hospital by Dr. Dean K. Crystal. At operation a grapefruit-sized, well-encapsulated tumor of the left adrenal gland was removed.

The pathological study of this tumor was done by Dr. S. A. Creighton, pathologist of the Children's Orthopedic Hospital. He reported the following findings. The specimen consisted of a mass measuring 10 by 7 by 8 cm. and weighing 240 gm. It was well encapsulated and slightly lobulated externally, while upon section the cut surface presented a rather soft, cellular appearance very suggestive of cancer, with numerous hemorrhagic areas here and there and yellowish calcific deposits. Although the tumor was encapsulated, he was inclined to regard this as a tumor originating from sympathetic tissue (neuroblastoma). The following findings

were reported from microscopic examination. Sections through the tissue received revealed tumor process characterized by aggregations of ovoid-to-round cells containing dark nuclei and very little cytoplasm. There was a supporting structure of fine, fibrous tissue in which blood vessels were noted. In some instances hemorrhage was noted throughout the tumor, while in other areas calcific deposition was present. The tumor cells arranged in sheets and columns had not formed typical rosettes, but in some areas an attempt at rosette formation was seen. Dr. Creighton could see no indication of a pheochromocytoma structure and believed this tumor to be a sympathicoblastoma type of neuroblastoma. In a few instances, large giant cells were noted, but these were not a feature of the section. The diagnosis was neuroblastoma.

Sections of the tumor were examined by Dr. Arthur C. Allen of the Department of Pathology, Memorial Hospital, New York, and he concurred in the diagnosis of neuroblastoma.

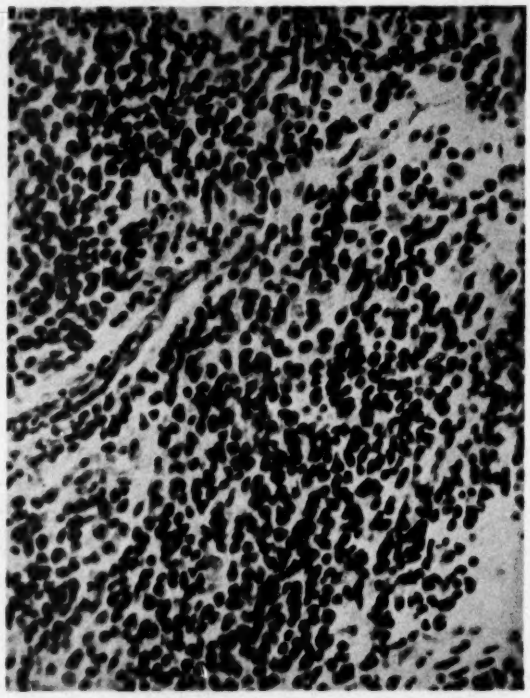


Fig. 5.—Photomicrograph of tumor tissue from the original tumor removed May 8, 1950.

After discharge from the Children's Orthopedic Hospital, following an uneventful postoperative course, the child was seen on May 15, 1950, in consultation at the Tumor Institute, Swedish Hospital, Seattle. At this time survey roentgenograms of the entire skeleton were made, and all were found to be normal. The roentgenogram of the femurs made at this time are shown in Figure 1. Since the removal of the tumor appeared to have been complete, it was felt that no radiation treatment was indicated.

Several weeks later the parents noted that the child was acting increasingly fussy. It was on or about June 20 (approximately six weeks postoperatively) that it was noted that the child seemed to have pain in the right leg and did not wish to have it moved. Repeat roentgenograms of the femurs taken on June 26, 1950, now showed some subperiosteal osteogenesis in the upper half of the right femur, associated with small areas of destruction in the cortex. It was felt that this was metastatic neuroblastoma and that no treatment was indicated. The child continued a similar course and within a month was obviously having pain in both legs, for which

he was receiving codeine daily. A third set of roentgenograms was taken on Aug. 14, 1950, at which time there was seen a marked advance in the destructive process of the right femur; and now the left femur was rather badly riddled with metastatic disease. On Aug. 5, 1950, a course of corticotropin therapy was instituted. The dosage was 50 mg. daily for the first four days and then 40 mg. daily. At the end of 10 days' treatment there was no observable change in the child's condition, and the child was showing a rather excessive emotional reaction to the injections; therefore the treatment was stopped.

During the next two months the parents observed no particular change in the child, and he continued to receive codeine for pain. From this time on, however, it seemed to the parents that he was having less pain and was becoming more active. From Dec. 1 on, the child received no more codeine. At this time the child started to creep, and at the age of 15 months he was pulling to his feet. At 20 months he was walking freely. At 23 months he was 35 in. (89 cm.) tall and weighed 29 lb. 8 oz. (13,400 gm.).

On July 31, 1951, at the age of 21½ months, the fourth set of roentgenograms of the femurs was made. They were found to be entirely normal.

At the time of this writing the child is 26 months old and is living in another city. In a personal letter, dated Dec. 1, 1951, the mother reported that the child seemed happy and normal in every way and was making excellent progress.

1301 Columbia St. (4).

ACUTE NEONATAL MYELOBLASTIC LEUKEMIA

ARTURO R. CASILLI, M.D.
WILLIAM L. RUMSEY, M.D.
AND
EMANUEL M. SATULSKY, M.D.
ELIZABETH, N. J.

THE PURPOSE of this report is to record a case of acute myeloblastic leukemia in an infant 8 days old. The unusual feature of this case is that a dermatological lesion was present simulating urticaria pigmentosa. The findings on a skin biopsy were interpreted as consistent with urticaria pigmentosa by a skin histopathologist. Further clinical and hematological observations finally led to the diagnosis of true acute leukemia, and this was proved by autopsy.

Leukemia occurring in the newborn in the first month of life is rare. Case reports of leukemia occurring within this age usually call it congenital leukemia. This appellation implies that the disease was acquired in utero. A review of the literature, however, reveals that the majority of cases reported under this diagnosis indicate there is little or no proof that the disease was actually congenital. Twelve cases can be accurately classified as such. Cross [1] cited eight cases in his paper, including one of Chapman [2] and one of Morrison.[3] Hamne [4] reported one and cited three more. In the other cases reported ages ranged from several weeks to several months or even years of age.[5]

From the Departments of Pathology and Pediatrics, St. Elizabeth Hospital.

1. Cross, F. S.: Congenital Leucemia, Report of 2 Cases, J. Pediat. **24**:191 (Feb.) 1944.

2. Chapman, S. G., and Ewart, I. B.: Acute Congenital Leucocythæmia, New Zealand M. J. **31**:19 (Feb.) 1932.

3. Morrison, M.; Samwick, A. A., and Rubinstein, R. I.: Congenital Leukemia with "Chloroma," Am. J. Dis. Child. **58**:332 (Aug.) 1939.

4. Hamne, B.: A Case of Congenital Myeloid Leukemia, Acta pædiat. **31**:330, 1944.

5. Houstek, J., and Brachfeldova, J.: Congenital Leukemia, Ann. pædiat. **172**:98 (Feb.) 1949. Keith, H. M.: Chronic Myelogenous Leukemia in Infancy, Am. J. Dis. Child. **69**:366 (June) 1945. Kornmann, V.: Early Infantile and Congenital Myeloid Leukemia, Ztschr. Kinderh. **56**:440, 1934. Methier, S. R., and Lucas, W. P.: Leukemia in Infants and Children, in Downey, H., editor, Handbook of Hematology, New York, Paul B. Hoeber, Inc., 1938, Vol. 4, p. 3039. Saldun de Rodriquez, M. L.; Norbis, A., and Iqlesias, M. E.: Acute Leukemia in Early Infancy, Arch. pediat. Uruguay **16**:457 (Aug.) 1945. Salomonsen, L.: Acute Myelogenous Leukemia in an Infant of 5 Months, Acta pædiat. **9**:497, 1930. Saxl, O.: The Problem of Leukemia in Infancy, Jahrb. Kinderh. **150**:228, 1937. Spigel, H. A.: Leukemias of Infancy and Early Childhood, Arch. Pediat. **55**:7 (Jan.) 1938. Stransky, E.: Congenital Myeloid Leukemia in Infant, Monatsschr. Kinderh. **29**:654 (Jan.-Feb.) 1925. Booth, M., and Rembolt, R. R.: Leukemia in Childhood: Evaluation of Present Status of Problem with Particular Reference to Study of Cases Treated at University of Minnesota Hospital from 1930 to 1938, Journal-Lancet **59**:216 (May) 1939.

REPORT OF A CASE

R. M. H., a girl, was delivered normally after an uneventful pregnancy. Her mother was a 26-year-old white primipara with a negative Wassermann reaction and blood type B, Rh positive. There were no signs of any blood dyscrasias in the mother, and the family history was negative. The birth weight was 6 lb. 3 oz. (2,800 gm.); the child presented no abnormalities. She was discharged from the hospital after five days, apparently normal, except for a loss of 11 oz. (227 gm.) in weight. This weight loss was interpreted as being due to a difficulty with breast feeding, since a shield had been used intermittently. No blood studies were done at this time.

The infant was next seen in the pediatric ward at the age of 12 days because of a skin eruption which had started on the eighth day of life. The original lesions were variously sized, flaccid vesiculopustules which developed on the upper chest wall. These spread rapidly

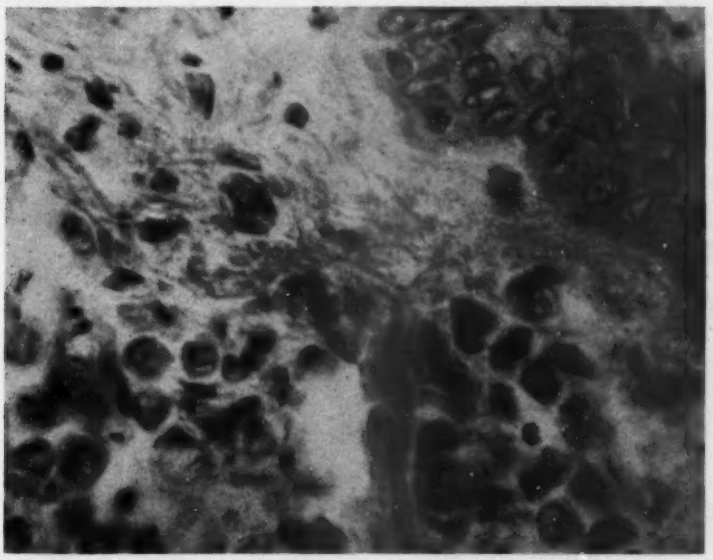


Fig. 1.—Myeloblastic infiltrate in cutis, with epidermis shown above. The large cells below the epidermis are myeloblasts. Hematoxylin and eosin; × 600.

but changed in the structure of the growth. No other symptoms or physical signs of disease were present. Her weight was 7 lb. 3 oz. (3,260 gm.).

Physical examination revealed a well-developed and well-nourished newborn infant. The temperature was 99 F. The skin showed many firm, purplish papules over the entire body except the palms and soles. The liver and spleen were not palpable. The rest of the physical findings were negative. Roentgenograms of the skeleton were reported as normal.

One of us (E. M. S.) was called to express an opinion on the skin lesions. The findings were as follows: The infant was well developed and did not appear acutely ill. The skin was covered with a generalized eruption. The child did not scratch herself and did not appear to be restless. The buccal mucosa was normal. The palms and soles were not involved. The eruption consisted of discrete and confluent yellowish-brown and reddish-purple macules, papules, and nodules. The lesions varied in diameter from that of a match head to that of a pea. The papules and nodules were firm on palpation. When the lesions were rubbed, an urticaria-like, reddish elevation was produced about them, while the lesions themselves lost some of their original color and became reddened.

On the basis of these clinical findings, a diagnosis of urticaria pigmentosa was made, and one of the nodules was removed for histological study. The specimen was sent to a skin histopathologist, who submitted a report stating that the microscopic findings were consistent with urticaria pigmentosa. He described an infiltrate consisting of large cells which were round or oval, with lightly staining eccentric nuclei (Fig. 1).

Blood study showed the following: hemoglobin, 19 gm.; red blood cell count, 5,200,000; white blood cell count, 59,000; neutrophil polymorphonuclear leucocytes, 12%; lymphocytes, 18%; myeloblasts, 1%; myelocytes, 64%; metamyelocytes, 4%; band forms, 1%. Two nucleated red cells per 100 leucocytes were found. Thrombocyte (platelets) were plentiful, with frequent large clumps. Urine examination showed a few leucocytes but otherwise no abnormalities.

The patient took her feedings well and was discharged to the care of her family physician with the diagnoses of urticaria pigmentosa and associated leukemoid blood response.

The infant was last admitted at 3½ weeks of age *in extremis* with a three-hour history of cyanosis and dyspnea.

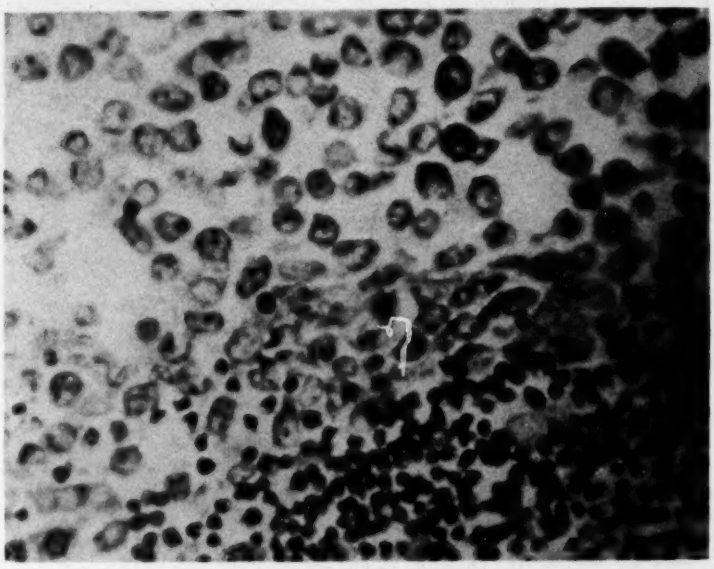


Fig. 2.—Myeloblastic infiltrate in spleen. The pale large cells are myeloblasts; the darker smaller cells are lymphocytes. Hematoxylin and eosin; × 600.

Physical examination revealed a moribund cyanotic infant. The skin lesions had now increased in size. Her lungs were full of bubbling rales. Despite heroic therapeutic measures, the infant died 40 minutes after admission.

Blood study done at the last admission showed the following: hemoglobin, 10 gm.; red blood cell count, 2,800,000; white blood cell count, 147,000; neutrophilic polymorphonuclear leucocytes, 3%; eosinophilic polymorphonuclear leucocytes, 1%; lymphocytes, 9%; normoblasts, 3 per 100 leucocytes; erythroblasts, 1 per 100 leucocytes; myeloblasts, 4%; promyelocytes, 69%; neutrophilic myelocytes, 8%; metamyelocytes, 1%; band forms, 5%.

A hematological diagnosis of acute myeloblastic leukemia was made. The skin lesions were now interpreted as leukemia cutis, and the original diagnosis of urticaria pigmentosa was abandoned.

One of us (A. R. C.) performed an autopsy three hours later.

A general examination revealed an intensely blue infant having blood-tinged froth at the mouth and nostrils. The weight was 6 lb. (2,700 gm.). The superficial lymph nodes were not

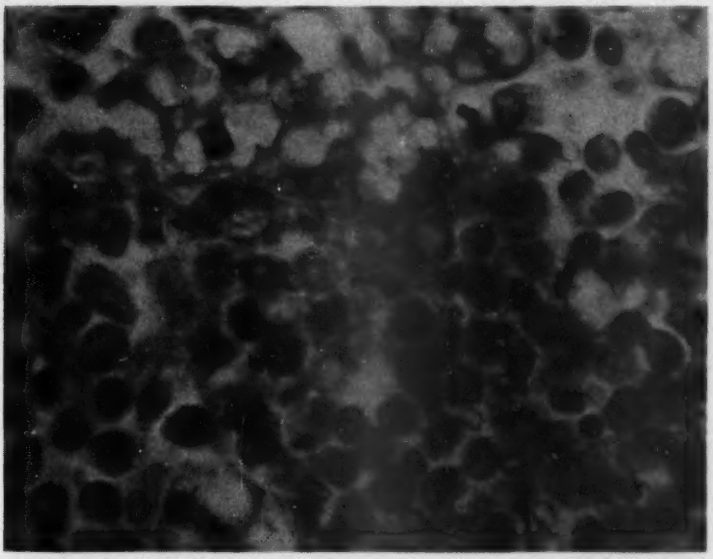


Fig. 3.—Myeloblastic infiltrate in liver, with marked fatty change. The solid dark cells are myeloblasts; there are several cells in mitosis, and the vacuolated cells are liver cells. Hematoxylin and eosin; × 600.

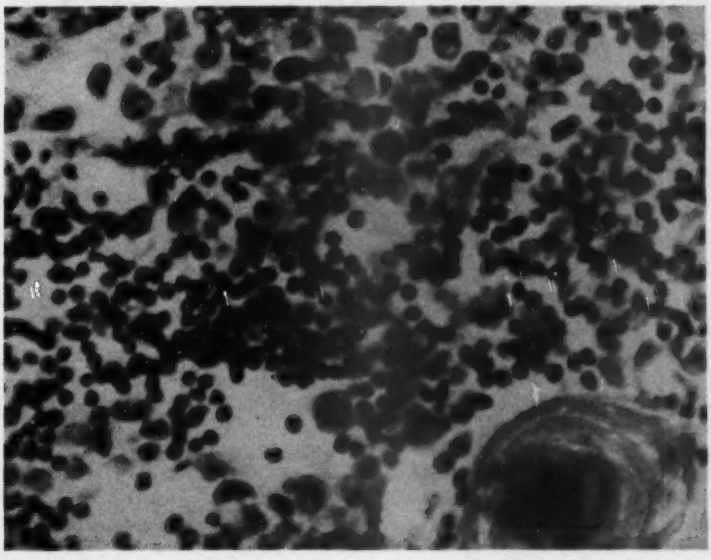


Fig. 4.—Myeloblastic infiltrate in thymus, with Hassall's corpuscle in lower right field. The large pale cells are myeloblasts; the small dark cells are lymphocytes. Hematoxylin and eosin; × 600.

enlarged. The skin showed a mottled background upon which many raised nodules, 3 to 10 mm., were noted over the entire skin, including the scalp but not the palms or soles. Some nodules were deep red, others pink, and still others almost white. Several nodules were sectioned and showed a wet, deep red, smooth surface.

Mottling and nodules were also observed in the lungs, ileum, colon, and portio vaginalis of the cervix. In these organs, especially the ileum and colon, the nodules were quite discrete and of the same size as those in the skin.

The major serous cavities were moist, smooth, and glistening. The organs of the chest, abdomen, and pelvis were in their natural position.

A study of the organs revealed the following: The brain showed acute capillary congestion. The ventricular system was normal. The weight was 350 gm. The fontanels were open. The venous sinuses contained fluid blood and small clots. The tongue, tonsils, larynx, and pharynx were blue. The thymus weighed 20 gm.

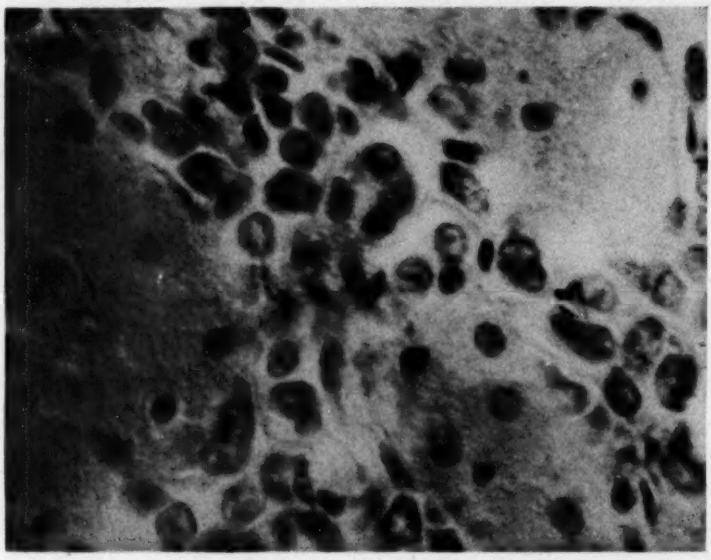


Fig. 5.—Myeloblastic infiltrate in kidney. The large cells between tubules are myeloblasts. Hematoxylin and eosin; × 600.

The heart weighed 15 gm. It was normal in shape and without congenital defects. The valves, endocardium, papillary muscles, and chordae tendineae were normal. The muscle was dusky red.

The lungs were inflated but soggy. The left lung weighed 30 gm.; the right, 40 gm. The cut surface was dusky red and showed mottling and many discrete nodules. The bronchial mucosa was covered with frothy fluid.

The gastrointestinal tract, except for discrete nodules in the ileum and colon, was normal. The spleen weighed 15 gm. The capsule was glistening and smooth. The cut surface showed a dusky-red, soft structure in which trabeculae and white pulp were not seen.

The liver presented a smooth, glistening capsule. Its shape and position were normal. The organ weighed 100 gm. The cut surface was dusky red and homogenous. The gall bladder and extrabiliary ducts were natural.

The pancreas and adrenals were not remarkable.

The combined weight of the kidneys was 20 gm. The capsules stripped off easily, leaving a dusky-red fetal lobulated surface, having congested stellate veins. The cortices were not

thickened and were sharply demarcated from the medullae. The color of the cortices was purplish and that of the medullae darker. The pelves, calices, and ureters were natural. The bladder was empty and normal.

The uterus and its appendages were found dusky red, but normal, except for a mottling and nodules in the portio vaginalis of the cervix.

The aorta and its main branches were elastic and the intima smooth.

The marrow of the lumbar spine, ribs, sternum, and femora was red and smooth.

Histological examination of the skin, lungs, spleen (Fig. 2), liver (Fig. 3), thymus (Fig. 4), adrenals, small and large intestines, kidneys (Fig. 5), and bone marrow (Fig. 6) showed infiltration in all of them with cells typical of myeloblasts. The cells were large, round, with pale-stained eccentric nuclei frequently in mitosis. The cytoplasm was basophilic. The brain was found free of leukemic cells.

The final diagnosis was acute myeloblastic leukemia.

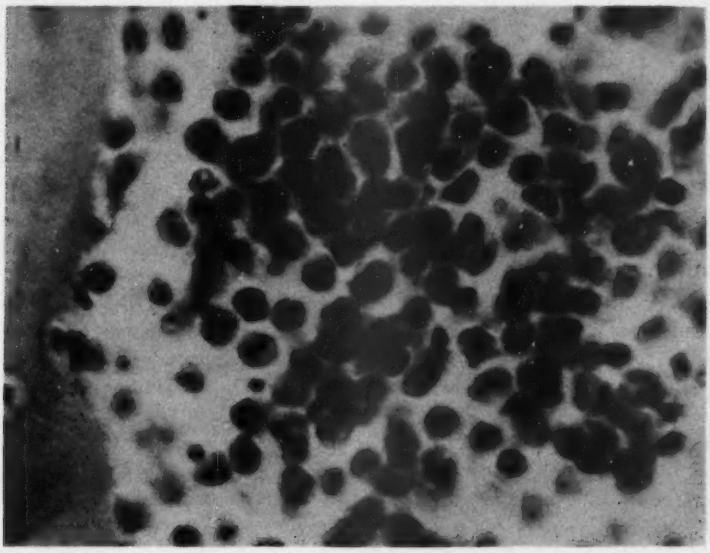


Fig. 6.—Myeloblastic proliferation in bone marrow of vertebra. Practically all large cells are myeloblasts, one in mitosis. Hematoxylin and eosin; × 600.

SUMMARY

A case of acute myeloblastic leukemia in an 8-day-old infant in whom the skin lesions simulated those seen in urticaria pigmentosa is reported.

618 Newark Ave.

The case reported is one of Dr. John Hamley's and is reported with his permission.

Obituaries

DR. CARLO COMBA
1870-1951

Carlo Comba was born on Nov. 15, 1870, and died in Florence on Nov. 4, 1951. Carlo Comba and Rocco Jemma are often spoken of as the leading pioneers of Italian pediatrics. Comba's early medical training was in pathology. In 1894 he joined the pediatric department of Prof. Mya in Florence, where he remained until 1903, when he was appointed professor of pediatrics at Bologna. In 1911, he returned to Florence as professor, which position he held until his retirement in 1943. He was one of the founders of La Società Italiana di Pediatria and was its president from 1920 to 1924. He was editor of the *Rivista di clinica pediatrica* for many years. In 1929, "Scritti medici dedicati a Cario Comba" was published; it contained clinical and scientific contributions by many Italian and foreign pediatricians. Comba's clinical contributions covered many fields, notably diphtheria, tuberculosis, meningitis, and measles. He was a leader in public health activities in Italy.

Abstracts from Current Literature

Biochemistry; Bacteriology and Pathology

ANTISTREPTOCOLYSIN TITERS IN THE NORMAL HEALTHY CHILD. C. IMPERATO and L. LANDUCCI, Pediatria **58**:899 (Nov.) 1950.

Methods of preparation of streptocolysin from hemolytic Streptococcus culture, methods of preserving it, and methods of using it in determining the titer of antistreptocolysin in blood serum are outlined. The titers in the sera of 110 healthy children between the ages of 4 months and 13 years varied over a wide range; they were definitely lower, as a rule, in the sera of infants and young children.

HIGGINS, Boston.

EXPERIMENTAL STUDIES ON THE EFFECTS OF STAPHYLOCOCCIC ENTEROTOXIN. P. TOLENTINO and G. BELLIENI, Pediatria **59**:309 (May) 1951.

A toxin was obtained from staphylococci cultured from the feces and the pharynges of hospital patients. The toxin was injected intraperitoneally into cats. Large doses led to tremor, ataxia, convulsions, and death in coma. Vomiting and diarrhea were not caused by the injections. Cloudy swelling of the liver and the kidneys was found, but the most striking histological changes were in the brain tissues. It appears that staphylococcic enterotoxin is primarily a neurotoxin.

HIGGINS, Boston.

Metabolism; Infant Feeding; Milk and Other Foods

UTILIZATION OF NON-SPECIFIC NITROGEN SOURCES BY THE ADULT PROTEIN DEPLETED RAT. DOUGLAS V. FROST and HARRY R. SANDY, J. Biol. Chem. **189**:249 (March) 1951.

The authors studied the response of protein-depleted rats to various amino acid mixtures and to nitrogen from various sources. The response to the administration of only the nine essential amino acids could be heightened by the inclusion of some of the nonessential amino acids and also, equally well, by the addition of ammonium chloride and urea to the diet. The data suggest that maximum utilization occurs when at least 20% of the total nitrogen of the diet is present as nitrogen other than that of the essential amino acids. It was also noted that the rats consumed solutions of complete protein hydrolysates fortified with tryptophan somewhat more readily than the pure amino acid mixtures. It would appear from these experiments that the essential amino acids themselves are not readily available for conversion to other generalized nitrogen components of the body.

FORBES, Dallas, Texas.

FURTHER STUDIES ON THE AMINO ACID COMPOSITION OF PORK AND LAMB CUTS. B. S. SCHWEIGERT, BARBARA A. BENNETT, and BARBARA TAIT GUTHNECK, J. Biol. Chem. **190**:697 (June) 1951.

The authors present data on the analysis of fresh and cooked pork and lamb cuts for glutamic acid, aspartic acid, tyrosine, proline, aminoacetic acid, serine, and cystine. The assays were carried out by microbiological methods. The amino acids were found to be stable upon cooking.

FORBES, Dallas, Texas.

ARTIFICIAL ENRICHMENT OF WHITE RICE AS A SOLUTION TO ENDEMIC BERIBERI: REPORT OF FIELD TRIALS IN BATAAN, PHILIPPINES. JUAN SALCEDO JR., M. D. BAMBA, EUFRONIO O. CARRASCO, GREGORIO S. CHAN, ISABEL CONCEPCION, FRANCISCO R. JOSE, JOSE F. DELEON, SALVADOR B. OLIVEROS, CONRADO R. PASCUAL, LEON C. SANTIAGO, and RAMON C. VALENZUELA, J. Nutrition **42**:501 (Dec. 11) 1950.

There was marked decline in the incidence of beriberi when enriched rice was used in the survey reported upon by the authors. Likewise the mortality from beriberi declined when fortified rice was fed. Infantile beriberi mortality declined 53% in the experimental area in the year

in which enriched rice was first introduced, although enrichment was in effect only during the last nine months of the year. There is evidence, of a less conclusive character, of the favorable effect of enriched rice upon mortality from all causes and specifically upon mortality from tuberculosis.

FREDEEN, Kansas City, Mo.

SUPPLEMENTAL VALUE OF CERTAIN AMINO ACIDS FOR LAMB PROTEIN AND NUTRITIVE VALUE OF PROTEIN IN DIFFERENT CUTS OF LAMB. RALPH HOAGLAND, N. R. ELLIS, O. G. HANKINS, G. G. SNIDER, and R. L. HINER, J. Nutrition **43**:423 (March 10) 1951.

The results of these experiments indicate that the protein from the entire carcass of lamb is deficient only in cystine or methionine. The addition of the same quantity of either amino acid to the diet was equally effective in promoting much more rapid growth and better utilization of the lamb protein.

FREDEEN, Kansas City, Mo.

THE EFFECT OF HEAT TREATMENT ON THE NUTRITIONAL VALUE OF SOME VEGETABLE OILS. EARLE W. CRAMPTON, FLORENCE A. FARMER, and F. MARION BERRYHILL, J. Nutrition **43**:431 (March 10) 1951.

While the results from this series of trials leave no doubt that heat polymerization does adversely affect the nutritive value of the oils examined, the mechanism of this damage was not elucidated. Digestion studies rule out incomplete absorption as a causal factor. It can be postulated that growth inhibition was either the result of some factor in the heated oil toxic to the animals or that it was a consequence of the destruction by abnormal products of fat polymerization of some necessary dietary component other than fat.

FREDEEN, Kansas City, Mo.

URINARY EXCRETION OF ESSENTIAL AMINO ACIDS BY HUMAN SUBJECTS FED DIETS CONTAINING PROTEINS OF DIFFERENT BIOLOGICAL VALUE. E. S. NASSET and R. H. TULLY III, J. Nutrition **44**:477 (July 10) 1951.

No correlation was found between the biological value of ingested protein and the total amount of essential amino acids excreted in the urine. The kidney is evidently extremely efficient in the absorption of amino acids from the glomerular filtrate. In absolute amount as well as in percentage of the amount ingested, histidine stands out as the exception among the "free" essential amino acids in the urine. It accounts for half or more of the essential amino acid excretion. The excretion of histidine was significantly greater when the diet contained gluten than when it contained whole fresh egg as a source of protein. On the biological-value scale gluten is obviously inferior to egg protein, and hence the difference in excretion of histidine may be considered another indication of poor utilization of gluten. In considering threonine, the situation is reversed, and the excretion of this essential amino acid was significantly greater with the diet which contained egg protein. Evidently, moderate deviations in either direction from nitrogen equilibrium do not affect the total urinary excretion of the essential amino acids. The total amino acid excretion with the protein-free diet was scarcely changed by the ingestion of approximately 5 gm. of protein nitrogen. The urinary excretion of "free" essential amino acids by adult men and women was determined when the diets contained no protein or small amounts of proteins of widely different biological value. No sex differences in amino acid excretion were detected.

FREDEEN, Kansas City, Mo.

INTERPRETATION OF THE BASAL METABOLIC RATE OF CHILDREN OF UNUSUAL BODY BUILD. ALBERTA ILIFF, VIRGINIA A. LEE, and ROBERT C. LEWIS, Pediatrics **8**:616 (Nov.) 1951.

In order to study the relative predictive value of six methods of reference frequently used to determine the basal metabolic rate of children of unusual body build, an analysis was made of 1,584 tests obtained on 953 healthy children, either from the studies of the Child Research Council or from studies described in the literature. These children were between 2 and 16 years old. Their weight or height, or both weight and height, fell above the ninetieth percentile or below the tenth percentile of all the children of similar age on whom the Council standards had been established.

The results of this analysis show that the methods of reference of calories per hour referred to surface area and of calories per hour referred to weight are reliable for the interpretation of basal metabolic rate determinations on children of all six types of body build studied. This is also true of calories per hour per square meter referred to age, except in the case of small children or dwarfs, for whom high basal metabolic rates are found. Reliance cannot be placed upon calories per hour per kilogram referred to age, calories per hour per centimeter referred to age, and calories per hour referred to height, either individually or collectively, for routine clinical use. However, the deviations in the basal metabolic rates obtained by these less satisfactory methods of reference may be of considerable importance in understanding the problems of a child of unusual body build.

Thus, the use of the proper methods of reference based on reliable standards will result in trustworthy basal metabolic rates for children of unusual body build.

FROM THE AUTHORS' SUMMARY.

RELATIONS BETWEEN SLOWED CIRCULATION, OXYGEN DEFICIENCY, AND INTOXICATION IN INFANCY. E. KERPEL-FRONIUS, F. VARGA, J. VONOCZKY, and K. KUN, Helvet. paediat. acta **6**:377 (Nov.) 1951.

The sequelae of slowed-down circulation in 29 patients with acute exsiccosis were compared with 31 control patients with atrophy and 4 with pyloric stenosis. The relationships of slowed circulation to oxygen consumption, oxygen saturation of the venous blood, and carbon dioxide and nonprotein nitrogen contents were examined. This comparison showed that reduction of the volume in acute anhydremia leads to an insufficiency in oxygen and to toxic phenomena because the bodily requirement for oxygen in this condition remains at the same level or is actually increased. Thus a disproportion exists between oxygen transport and necessary supply. On the other hand, in pronounced atrophy and pyloric stenosis, the retarded circulation is still sufficient for the reduced metabolic requirements. No disproportion between oxygen transport and necessary supply exists despite the slow circulation. Therefore these patients are not "toxic" despite their circulatory failure. The observations mentioned above meet several objections which can be brought against the "circulation theory" of infantile toxicosis.

FROM THE AUTHORS' SUMMARY.

USE OF HYDROLYZED PROTEIN IN TOXIC AND ATHREPTIC INFANTS. G. C. ABBA and V. CASTELNOVI, Lattante **21**:753 (Dec.) 1950.

Ten cubic centimeters of a 10% solution of "nutramina," a hydrolyzed protein, when given intravenously daily over a period of two to four days, contributed in overcoming the toxicity of infants with acute diarrhea. Hydrolyzed protein also proved helpful in stimulating gains in weight by athreptic infants.

HIGGINS, Boston.

COMPARISON OF PACCHIONI'S FORMULA WITH 'PANTOLAC.' C. CISI, Lattante **22**:492 (Aug.) 1951.

Clinical experience in the use of Pacchioni's "miscela alimentare B," a modified milk formula chemically similar to mother's milk, has been very satisfactory. A proprietary preparation, "pantolac," also chemically like mother's milk, has proved to be an easily prepared and a well-tolerated feeding for infants.

HIGGINS, Boston.

LYSOZYMES IN THE INFANT'S NUTRITION. G. POLI and E. HOLZKNECHT, Minerva pediat. **3**:386 (July) 1951.

The lysozymes in the food, the saliva, and the gastric juice of breast-fed infants are not destroyed by peptic or tryptic digestion. They remain in the bowel until passed in the feces as long as the bowel contents are acid. They will thus afford a good defense against pathogenic bacteria. On the other hand, cow's-milk formulas contain no lysozymes, and such lysozymes as come from the saliva and the gastric juice are destroyed by the alkalinity of the bowel contents. Egg white has considerable lysozyme activity, but egg yolk has very little. Beef has some lysozyme activity.

HIGGINS, Boston.

OBSERVATIONS OF FRACTIONATION WITH 26% SODIUM SULFATE OF SERUM PROTEINS OF INFANTS WITH TOXICOSIS. E. GRASSO and M. NEGRI, Minerva pediat. **3**:403 (July) 1951.

Duplicate determinations of the serum-protein fractions of infants with toxicosis were made using 21.5% sodium sulfate and 26% sodium sulfate. With 21.5% sodium sulfate, the results of the analyses indicated in each hypoglobulinemia and hyperalbuminemia. With 26% sodium sulfate, some of the analyses indicated a normal globulin/albumin ratio in the serum, while in other infants the analyses indicated hypoglobulinemia and hyperalbuminemia.

HIGGINS, Boston.

FEEDING OF INFANTS IN RURAL AREAS. JOSÉ A. NIETO FERRARO, Acta pediat. españ. **97**:57 (Jan.) 1951.

Ferraro discusses the feeding of infants in a fairly prosperous rural area in the province of Leon. The problem is not economic but educational. Due to the popularity in the last century of a starvation diet as treatment for diarrhea a diluted skimmed-milk diet is in many cases the sole food used in the first year of life. Respect for tradition and supervision by grandmothers are formidable obstacles, but many of the younger mothers are taking advantage of well-baby clinics for advice and supervision of their children. More clinics are needed, and more effective education of mothers is necessary, but the author feels that rural doctors should take a greater interest in this form of education.

ALLEN, SANTA FE, N. M.

FEEDING OF BOVINE SERUM IN ACUTE AND CHRONIC ALIMENTARY DISTURBANCES. HANS E. REINLEIN and HELMUT H. GEERING, Arch. Kinderh. **140**:114 (No. 3) 1950.

The authors discuss the cases of four patients with alimentary toxicosis who responded favorably to oral use of bovine serum containing added pancreatin (400 to 500 cc. daily). The rapid disappearance of dehydration and toxic manifestations is explainable by the fact that the cystine and tryptophan contents counteract the hypoproteinemia. Consequently, this regimen is helpful even after other food constituents may have been added.

GOTTSTEIN, Chicago.

DIFFERENCES IN BIOCHEMICAL QUALITY OF VEGETABLES GROWN WITH VARIOUS MANURES AND THEIR EFFICIENCY IN THE NUTRITION OF INFANTS. W. CATEL, Deutsche med. Wchnschr. **75**:1337 (Oct. 6) 1950.

Vegetables were grown on plots prepared with stable manure or with this manure and added nitrate, phosphorus pentoxide, and potassium magnesium sulfate. The vegetables grown from soil prepared with mixed manure enhanced the gain in weight of infants and favored hematopoiesis as well as the iron- and vitamin-A content of the serum. Catel also believes that resistance to intercurrent disease was increased.

AMBERG, Rochester, Minn.

IS IT PERMISSIBLE TO NURSE AN INFANT IN CASE OF PUERPERAL MASTITIS? HEINZ KIRCHHOFF, Deutsche med. Wchnschr. **76**:1338 (Oct. 26) 1951.

Of 152 breast-fed infants whose mothers had mild mastitis, 10 became ill. When the mastitis was of moderate severity, 19 of 34 became ill, and 3 died. When the mastitis was severe, 11 of 16 infants became ill, and 5 died. The author concludes positively that an infant should not be breast-fed when there is mastitis and that breast feeding should be stopped at once when mastitis occurs.

AMBERG, Rochester, Minn.

Vitamins; Avitaminoses

VITAMIN REQUIREMENTS IN ADOLESCENCE. HARRY A. WAISMAN and JULIUS B. RICHMOND, J. Pediat. **37**:922 (Dec.) 1950.

The vitamin requirements of adolescents are not known exactly. These authors reviewed most of the literature on the subject and suggest that perhaps the requirements may be about as follows: vitamin A, 3,000 to 6,000 I. U.; vitamin D, 1,000 I. U.; thiamine, 1.0 to 1.8 mg.; riboflavin, 0.88 to 1.32 mg.; ascorbic acid, 80 to 100 mg., and nicotinic acid 10 mg.

MACDONALD, Pittsburgh.

VITAMIN E BLOOD LEVELS IN INFANTS. S. W. WRIGHT, L. J. FILER JR., and K. E. MASON, Pediatrics **7**:386 (March) 1951.

Newborn infants showed serum-tocopherol levels approximately one-fifth those of the mothers. During the first six days after birth the serum-tocopherol levels of breast-fed infants increased much more rapidly than those of bottle-fed infants. These differences were still evident at 1 to 4 and 5 to 8 months of age. Premature infants fed an artificial formula low in vitamin E showed a rapid decline in serum-tocopherol levels. These studies confirm and amplify other evidence that placental transfer to tocopherol is decidedly limited while mammary transfer is much more extensive.

FROM THE AUTHORS' SUMMARY.

SCURVY AND TUBERCULOUS PERITONITIS. R. DERHAM, Arch. Dis. Childhood **25**:159 (June) 1950.

Scurvy in a girl nearly 11 years old is described. The patient's previous history included tuberculous peritonitis, and this may have had a relationship to the development of scurvy, which was chronic and was accompanied by physical and mental retardation. The origin of the disease is discussed and the result of treatment described.

KELLY, Milwaukee.

RENAL FUNCTION AFTER SHOCK INJECTION OF VITAMIN D_3. GIO MARIA DORE, Ann. Ital. Pediat. **3**:439 (Oct.) 1950.

The author tested in five normal children the variations of phosphorus, nitrogen, and chloride blood levels and of phosphorus, nitrogen, and chloride urinary concentration after a single administration of 30 and 45 mg. of calciferol. He observed the following results: (1) increase of azotemic level concomitantly with a remarkable increase of urinary nitrogen concentration, (2) increase of inorganic phosphoremia and phosphaturia, and (3) slight fall of blood chloride (plasmatic, globular, and total), with nonevident variations of urinary elimination.

The above variations return to the starting values within about one week. Renal function seems not to be disturbed by the administration of an unusually large dose of calciferol, while there is a powerful stimulation of protein metabolism probably due to a specific action.

FROM THE AUTHOR'S SUMMARY.

VARIATIONS OF INORGANIC PHOSPHORUS, CREATINE, AND CAPILLARY AND VENOUS GLYCEMIA AFTER VITAMIN-E DEFICIENCY. PAOLO PROSPERI and FRANCESCO RAGAZZINI, Riv. clin. pediat. **48**:763 (Dec.) 1950.

The authors have studied the behavior of inorganic phosphorus, of creatine and creatinine, and of arterial and venous glycemia in 15 children by means of a complete analysis of the variations in the hematic levels after treatment with vitamin E orally (100 to 200 mg.). They found (1) a decrease in inorganic phosphorus, (2) absence of any of the typical aspects of arterial and venous glycemia, with a certain tendency to differential glycemia, and (3) a decrease, though less constant, in creatine.

The authors consider that these results confirm the hypothesis, formerly made elsewhere, that administration of Vitamin E strengthens the links between creatine and phosphorus radicals through stopping the process of phosphorization necessary to the transformation of glycogen. Thus we can also explain the increase of glycogen found in animals treated with vitamin E, as well as the increase of phosphagen in the same kind of experiments.

FROM THE AUTHORS' SUMMARY.

CRANIOSTENOSIS AND VITAMIN-D-RESISTANT RICKETS. OLGA IMERSLUND, Acta pædiat. **40**:449 (Sept.) 1951.

The finding of signs indicative of the same combination of conditions in mother and child suggests a hereditary syndrome *sui generis*. The hereditary factor or factors responsible for this syndrome have given rise, on the one hand, to craniostenosis and, on the other hand, to vitamin-D resistance with consequent rickets.

FROM THE AUTHOR'S SUMMARY.

Hygiene; Growth and Nutrition; Public Health

THE ENERGY EXPENDITURE FOR QUIET PLAY AND CYCLING OF GIRLS 6 TO 14 YEARS OF AGE. ETHEL M. THOMPSON, MARY E. R. BAL, EDNA M. MCINTOSH, GRACE MACLEOD, and CLARA M. TAYLOR, J. Nutrition **44**:275 (June 11) 1951.

Fifty-four determinations of energy expenditure for quiet play and fifty-five for cycling, by 20 girls, 6 to 14 years old, are reported. It was noted that energy expenditure for both quiet play and cycling, expressed as calories per kilogram per hour, decreases with increase in age. The same is true of energy expended per centimeter of height in cycling, but for quiet play the expenditure is practically the same in the three age groups. FREDEEN, Kansas City, Mo.

THE ENERGY EXPENDITURE OF BOYS AND GIRLS 9 TO 11 YEARS OF AGE (1) WASHING AND WIPING DISHES, (2) BOYS ENGAGED IN CARPENTRY, AND (3) GIRLS SEWING. CLARA MAE TAYLOR, ORREA FLORENCE PYE, MARY SCHAFER, and SHIRLEY WING, J. Nutrition **44**:295 (June 11) 1951.

In washing and wiping dishes, boys showed a slightly higher energy expenditure than girls. It is of interest to note that the boys and girls in this investigation had an average energy expenditure per kilogram of body weight for dishwashing approximately 39% above the average generally accepted for adults.

Although the carpentry in which the boys in this study engaged should be considered light carpentry, the energy expenditure per kilogram of body weight was slightly higher than that generally accepted for men doing heavy carpentry. Likewise, the girls had a higher energy requirement for hand sewing than that found for women. This is in line with other studies demonstrating the higher energy requirement of children per kilogram of body weight. The subjects in this investigation were 10 boys and 8 girls, 9 to 11 years old.

FREDEEN, Kansas City, Mo.

GROWTH AND DEVELOPMENT OF NEGRO INFANTS: LLI. GROWTH DURING THE FIRST YEAR OF LIFE AS OBSERVED IN PRIVATE PRACTICE. ROLAND B. SCOTT, W. WARRICK CARDOZO, and ALONZO G. SMITH, J. Pediat. **37**:885 (Dec.) 1950.

The authors have established growth curves for the first year of life from Negro infants seen in private practice. Differences in infants' growth curves are dependent upon differences in economic environment and not upon differences in race, they conclude.

MACDONALD, Pittsburgh.

THE PEDIATRICIAN AND PUBLIC HEALTH ADMINISTRATION FOR MOTHERS AND CHILDREN. FRANCISCO J. MENCHACA, Bol. Inst. internac. am. protec. infancia **23**:337 (Dec.) 1949.

In view of the complexity of the medicosocial problems that influence infant mortality, it is considered necessary to utilize some concepts and principles of public health administration for the purpose of carrying on the fight on a systematic basis.

Among the concepts of public health administration that may be borne in mind by the pediatrician, the following are most important: (*a*) statistical analysis, (*b*) coordination of activities, (*c*) work in well-defined sections, (*d*) decentralization of responsibility, and (*e*) centralization of control.

It is not a matter of falling into a cold bureaucratic routine but of effecting an integration between our experience with the patients and the administrative procedures which may be necessary, if we wish to change from individual to collective medical service. To love infants, to study their problems, and to solve them methodically must be the first and last incentives of a pediatrician.

FROM THE AUTHOR'S SUMMARY.

FAMILY SOCIAL WORK (PROBLEMS OF PROFESSIONAL TRAINING). AUGUSTA SCHROEDER, Bol. Inst. internac. am. de protec. a la infancia **23**:364 (Dec.) 1949.

The author sets the following standards for family social work. 1. Family case work should be the basis for the training of every social worker. 2. The strength of the marriage and the

economical, cultural, and educational capacity of the family must be the object of investigation, and social diagnosis the goal that social treatment must attain. 3. The pupil must visit at least 30 families during her six months' practice and make a start at constructive work. 4. For the preparation of pupils it is advisable for an institution not only to use family social work as a means and method but also to recognize it as an end in itself. 5. Family social work does not deal with the individual case alone but with groups: It needs the collaboration of organizations, such as parents' and mothers' associations, social clubs for young couples and engaged persons, associations of large families, consulting agencies for problems of family education, and recreational associations for families. 6. The social capacity of the social worker must not be a technique learned by routine but must be the result of a feeling of human fraternity characteristic of those who are social workers by conviction and practice.

FROM THE AUTHOR'S SUMMARY.

INFLUENCE OF INFANTS WELFARE CENTERS ON MORBIDITY AND MORTALITY IN INFANTS. FRITZ KARLSTRÖM, Svenska läk.-tidning. **47**:360 (Feb. 17) 1950.

In the years 1944 to 1948 23,450 infants were born in the province of Värmland, Sweden, and of these 21,789 were supervised at infants welfare centers. A study of supervised and unsupervised sick infants admitted to the children's hospital of the province showed that rickets and tetany were 10 times more frequent, acute respiratory infections 5 times, diarrhea 4 times, and anemia 3 times more frequent among the unsupervised infants. The mortality rate was seven times higher in the latter group.

WALLGREN, Stockholm, Sweden.

Prematurity and Congenital Deformities

INFLUENCE OF MATERNAL AND OBSTETRICAL FACTORS ON FETAL SURVIVAL. J. L. FITZGERALD, G. N. FERRIS, and C. E. TOSHACH, Am. J. M. Sc. **222**:40 (July) 1951.

This study concerns 52 premature and 82 mature infants who failed to survive in a series of 3,751 deliveries. Of this group, congenital anomalies incompatible with life were the designated cause of death in 24.6%. The corrected fetal mortality rate, excluding malformations, was 1.8% of all mature infants. For the premature infants of all three groups the corrected mortality rate was 15.3%.

Of premature infants, 43% have obstetrical or maternal complications which adversely influence their chance to survive. These factors were present in 74.5% of mature infants.

The authors believe that breech delivery presents the greatest hazard to both mature and premature infants. Better psychological preparation of the mother for the onset of labor will decrease the need for sedation, to the benefit of the child. Irrespective of the birth weight of the premature infant, a child born without the handicap of obstetrical complication or a sick mother has an excellent chance to survive.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

FUNNEL CHEST (PECTUS EXCAVATUM) IN INFANCY AND ADULT LIFE. A. LINCOLN BROWN and ORRIN COOK, California Med. **74**:174 (March) 1951.

Funnel chest, unless corrected, may lead to cardiorespiratory distress or psychic problems or both. Since operation to correct the deformity is relatively simple if done in infancy and much more extensive if done later, early surgical intervention is indicated. If the condition is not noted until the patient is beyond infancy, cardiorespiratory studies will aid in determining the advisability of operation.

PRYOR, Redwood City, Calif.

ELECTROENCEPHALOGRAPHY OF THE NEWBORN INFANT: VI. STUDIES ON PREMATURE INFANTS. J. G. HUGHES, BILLIE CAMP DAVIE, and MARJORIE LEAK BRENNAN, Pediatrics **7**:707 (May) 1951.

A report is given concerning normal electroencephalographic patterns of premature infants in the first days of life. Thirty-one electroencephalograms on 22 premature babies constitute the basis of the report.

Three main frequency bands were noted: waves of 2.5 to 4 cycles a second, which usually appeared singly with amplitudes of 45 to 80 μv.; waves of 5 to 7 cycles a second, occurring in episodes of 1 to 1½ seconds with amplitudes of 25 to 40 μv., and frequencies of 11 to 15 cycles a second, which appeared in episodes of ⅜ to 2½ seconds with amplitudes of 10 to 20 μv. The 11-to-15 cycle waves appeared more consistently than did the other frequencies observed and were usually more prominent in the frontal region.

These findings indicate that in premature infants cortical electric activity from the frontal region is better developed in regard to frequency, amplitude, and rhythm than are the brain potentials from other areas of the cortex. This observation is contradictory to what would be expected from consideration of the embryonic maturation of the human cortex.

FROM THE AUTHORS' SUMMARY.

THE PREMATURE BABY. J. L. WADDY, Clin. Rep. Adelaide Child. Hosp. **2**:48 (May) 1951.

Experiences in 1950 at the Mareeba Babies Hospital are summarized. Treatment, mortality rates, and facilities for the care of premature infants are discussed. Among 99 premature babies there were 34 deaths during the year, a rate of 34.2%. The figures are thought to be unduly high, partly because many of the babies are transported from some distance and many were sick on arrival. The author feels that premature babies should not be transported before they are 24 hours old.

McGUIGAN, Evanston, Ill.

ELLIS-VAN CREVELD SYNDROME. IGNAZIO GATTO, Helvet. paediat. acta **6**:437 (Nov.) 1951.

The syndrome of dyschondroplasia, polydactylism, ectodermal dysplasia (alterations of nails and hair), and congenital heart disease presents a uniform clinical entity which may be designated as the Ellis-van Creveld syndrome, after the authors who first described it. In isolated cases one or another symptom may be absent, or new ones may appear. For instance, in our case changes in the hair were missing; on the other hand, psychic and sexual underdevelopment was apparent. The syndrome is probably inherited on the basis of a recessive monomeric characteristic, showing a varying frequency of particular symptoms.

FROM THE AUTHOR'S SUMMARY.

NEW CASE OF FAMILIAL PACHYDERMA (CUTIS VERTICIS GYRATA) WITH PACHYPERIOSTOSIS OF THE EXTREMITIES VERIFIED ANATOMICALLY. A. FRANCESCHETTI, R. GILBERT, D. KLEIN, and P. WETTSTEIN, Schweiz. med. Wchnschr. **79**:1301 (Dec. 9) 1950.

The patient, 43 years old, showed characteristic apposition of bone without increase in length and characteristic changes in the skin (including "bulldog" scalp). A good description of the ailment is given. The first changes occur between the ages of 14 and 18, and hereditary origin has been seen rather frequently.

AMBERG, Rochester, Minn.

SITUS INVERSUS TOTALIS: DIAGNOSTIC ERRORS IN VISCERAL TRANSPOSITIONS. D. MANUEL TONTOIRA PEON, Acta pediat. españ. **8**:1319 (Nov.) 1950.

Case histories are given of three children with visceral transposition which was diagnosed as intussusception, intestinal obstruction, and congenital heart disease, respectively, but which proved to be congenital situs inversus totalis. The author states that in every child called a blue baby at birth at least dextrocardia should be considered, along with possible transposition of other viscera in the abdomen. Another diagnostic sign to watch for is left-handedness with marked lower descent of the right testicle and no descent of the left testicle. Other congenital anomalies and deformities are frequently associated with this condition.

Peon also suggests that whenever there is a question of major surgery, transposition should be considered, because in many cases this condition simulates acute pulmonary, abdominal, and cardiac conditions in children.

The patient should be given a medical certificate stating that he has this anomaly, and he should carry the certificate with him at all times to prevent future diagnostic errors.

ALLEN, Santa Fe, N. M.

HYPERTELORISM COMBINED WITH POLYDACTYLISM, HYPERPHALANGISM, AND DIGITI SPATULAFORMES. D. P. R. KEIZER, Maandschr. kindergeneesk. **18**:373 (No. 10) 1950.

The author reports the case of a 7-year-old girl with a previously unknown congenital malformation consisting in hypertelorism, hyperphalangism, supernumerary fingers and toes, and spatular fingers.

VAN CREVELD, Amsterdam, Netherlands.

Newborn

SODIUM SULFACETIMIDE FOR THE PROPHYLAXIS OF GONORRHEAL OPHTHALMIA NEONATORUM. J. EDMUND BICKEL, J. Pediat. **37**:854 (Dec.) 1950.

On the basis of a study of 1,907 infants, Bickel suggests that a 30% solution of sulfacetamide sodium is effective in preventing acute infectious gonorrheal conjunctivitis (gonorrheal ophthalmia neonatorum). In his study, this solution produced less chemical conjunctivitis than 1% silver nitrate.

MACDONALD, Pittsburgh.

PERFORATED GASTRIC ULCER IN A NEWBORN INFANT. LYDIA T. WRIGHT and BEATRICE E. SCOTT, J. Pediat. **37**:905 (Dec.) 1950.

The authors report the case of an infant who became cyanotic the day after delivery and died on the fifth day. Necropsy disclosed a perforated ulcer of the stomach. The mother was preeclamptic and syphilitic. She had received penicillin, bismuth, and oxophenarsine hydrochloride. The authors see no definite connection between the maternal history and the infant's ulcer.

MACDONALD, Pittsburgh.

THROMBOCYTOPENIA OF THE NEWBORN. RAYMOND J. LADRIERE, South. M. J. **44**:355 (April) 1951.

The case is reported of an infant in whom purpuric manifestations developed on the first day of life. These cleared spontaneously within about eight days. The bleeding time was prolonged. The platelets, initially 130,000 per cubic millimeter, fell to 46,000 and did not rise to 160,000 until the infant was 17 weeks old. The mother had had a splenectomy because of essential thrombocytopenic purpura two and one-half years before the infant was born. This is the eighth reported case of an infant with this condition born of a mother with thrombocytopenic purpura.

LOGAN, Rochester, Minn.

TETANUS NEONATORUM. D. B. JELLIFFE, Arch. Dis. Childhood **25**:190 (June) 1950.

The author discusses the etiology and clinical picture of tetanus neonatorum in Ibadan, Nigeria, with a brief review of 25 cases. An unusual case of chronic tetanus neonatorum, complicated by anemia, inanition, and an aerocele, is reported.

KELLY, Milwaukee.

OSTEOMYELITIS IN THE NEWBORN. JOHN THOMSON and IAN C. LEWIS, Arch. Dis. Childhood **25**:273 (Sept.) 1950.

The authors report four cases of neonatal osteomyelitis occurring in immature infants. These cases are divisible into two clinical groups, one relatively mild, the other severe and carrying considerable risk to life. The potential danger from micrococcal skin lesions in the neonatal period and the particular susceptibility of immature infants are stressed. Attention is drawn to a probable increase in the number of patients with disability following neonatal osteomyelitis who may be seen in orthopedic clinics.

KELLY, Milwaukee.

THE EFFECTS OF NEONATAL ASPHYXIA ON PHYSICAL AND MENTAL DEVELOPMENT. W. A. B. CAMPBELL, E. A. CHEESEMAN, and ANNE W. KILPATRICK, Arch. Dis. Childhood **25**:351 (Dec.) 1950.

After due allowance for relevant concomitant factors, the authors found that, with only one exception, there was no significant difference in the average physical measurements (height,

weight, inspired chest measurements, and chest expansion), in hemoglobin levels, or in intelligence distributions between a group with asphyxia and a control group. The exception occurred in the comparison of mean chest measurements of first-born boys: The mean for the group with asphyxia was just significantly less than that for the control group.

A brief review of other investigations on this subject is included. Contrary to the general impression that most other studies give, the present data and analysis do not support the hypothesis that asphyxia neonatorum is a common cause of later mental or physical retardation. One investigation (McPhail and Hall, 1941), conducted in a way similar to the present inquiry, led to similar results with reference to intelligence rating.

KELLY, Milwaukee.

HEMORRHAGIC DISEASE OF THE NEWBORN PRESENTING AS UNILATERAL PROPTOSIS. I. KESSEL and C. G. WILLIAMS, South African M. J. **25**:126 (Feb. 24) 1951.

Two cases of hemorrhagic disease of the newborn are presented in which the only abnormal physical sign was exophthalmos (proptosis) of one eye due to orbital hemorrhage.

McGUIGAN, Evanston, Ill.

FRACTURE OF CLAVICLE AS BIRTH INJURY IN THE NEWBORN. A. ENZLER, Schweiz. med. Wchnschr. **48**:1280 (Dec. 2) 1950.

In the gynecologic clinic of Basel, 105 fractures of the clavicle were found in 5,630 births during 1947 and 1948, that is, 1.8%. Various aspects of fractures are discussed, such as localization and kind of fracture. Only under special conditions is it necessary to resort to therapeutic measures other than careful handling of the infant. Roentgenograms of the six most severe fractures are given with follow-up roentgenograms after one-half to two years, showing complete recovery without special treatment.

AMBERG, Rochester, Minn.

TETANUS OF THE NEWBORN. JESUS MARTINEZ FERNANDEZ, Acta pediat. españ. **9**:840 (July) 1951.

The author states that, although tetanus has become a rare disease, there are places and conditions in which it still exists. He describes the clinical course, treatment, etc., in a newborn infant whom he saw in a remote village on the eighth day after birth. The family had noticed nothing unusual except that the baby held his jaws tight and could not be fed. Despite treatment with antitoxin, antibiotics, nasal feedings, etc., the child died within three days of the initial presenting symptom. Although the family said aseptic precautions were observed by the attending midwife, the portal of entry was the umbilical cord.

ALLEN, San Francisco.

SMALLPOX VACCINATION IN NEWBORN INFANTS. PROSPERO ARRIAGADA, Rev. chilena pediat. **22**:323 (Aug.) 1951.

Smallpox vaccination by multipuncture was successful in 76% of 266 newborn infants. This percentage was as high as 100% when the mothers were not immune. It seems, then, that absence of immunity in the mother means a like condition in the offspring. On the other hand, maternal immunity produces immunity only in a very low percentage of newborn infants. Therefore, from a practical standpoint, no newborn should be considered immune.

Although severe complications of vaccination are rare at this age, vaccination is not recommended unless there are peculiar epidemiologic conditions, because of the frequent occurrence at this age of encephalopathies which might be difficult to differentiate from true vaccinal encephalopathies.

FROM THE AUTHOR'S SUMMARY.

DIAGNOSIS OF INTRACRANIAL HEMORRHAGE DUE TO BIRTH TRAUMA. G. SCHUETTE, Monatsschr. Kinderh. **97**:295 (Sept.) 1949.

The quotient of serum bilirubin/cerebrospinal bilirubin was found to be a reliable diagnostic aid in intracranial birth hemorrhage. Cerebrospinal bilirubin was elevated when such trauma had occurred. The validity of this method was proved by subsequent autopsy findings.

HARTENSTEIN, Madison, Wis.

CURED CUTANEOUS RETICULOENDOTHELIOSIS IN A NEWBORN INFANT. M. MEUNIER, Acta pædiat. belg. **3**:149 (No. 3) 1949.

A one-month-old child showed a bluish macular eruption beginning in the face and spreading to body and extremities. No enlargement of lymph nodes, liver, or spleen was noted. At biopsy nodular and trabecular infiltration of the dermis with lymphoblastic cells, resembling monocytes, fibrocytes, and histiocytes, was seen. The blood count showed marked leucocytosis (72,000 white blood cells) with 81% lymphocytic elements, of which about one-half were abnormal forms (blasts). When the child was about 3 months old, the skin lesions had disappeared and the blood count returned to normal. The child was observed for over one year and showed no recurrences and a normal development.

The author discusses the diagnostic possibilities, such as reticuloendotheliosis with lymphatic reaction of the blood, a lymphatic leukemia with skin manifestations, or simply violent and temporary imbalance of the newborn blood system.

GLASER, Jerusalem, Israel.

BLOOD TRANSFUSIONS IN FETAL ERYTHROBLASTOSIS. J. PENIAŽKA, Pediat. listy **5**:82 (No. 2) 1950.

Eight cases of hemolytic disease of the fetus (fetal erythroblastosis) are reported. In six of them exchange transfusion has been performed, four successfully and two unsuccessfully. In one case postmortem examination disclosed an extensive cerebral hemorrhage. In the other case, that of a premature infant delivered by Caesarean section, a general prehydropexic state, with severe changes of organs, was found at autopsy.

FROM THE AUTHOR'S SUMMARY.

EXPERIENCES IN TREATMENT OF ERYTHROBLASTOSIS FETALIS. G. M. H. VEENEKLAAS, Maandschr. kindergeneesk. **18**:169 (No. 3/4) 1950.

Forty-five exchange transfusions were performed in 40 patients with hemolytic disease of the fetus (fetal erythroblastosis). On five occasions this was done with dying patients who died soon afterward. One child died after three days from erythroblastosis. Another, 3 weeks old, died presumably from a streptococcal infection, after having been in a continuously favorable condition. Forty-three of the donors were males.

Kernicterus was seen in four patients. For those children exchange transfusion was done at least twice, on different days. Jaundice and kernicterus vanished within 24 to 48 hours after the repeated exchange transfusion. Three of these patients are now more than one year old. Two are quite normal; the condition of the third is debatable. One child with severe hydrops is alive but is an idiot. All other children are in excellent health.

The exchange transfusion was done via the umbilical vein of infants up to the age of one week. Twenty-eight children were followed clinically and hematologically once a week during the first three months and once a month during the next nine months. Without exception an anemia, consisting in 5.8 to 5.9 gm. of hemoglobin per 100 cc., developed in six weeks. Reticulocytes and Rh-positive red cells in the peripheral blood increased after the eighth week. This phenomenon is identical in treated children and in untreated children. The explanation may be that the bone marrow in cases of hemolytic disease of the fetus is invariably damaged. The decreased erythroblast count and the increased number of reticulum cells in the bone marrow of erythroblastotic babies lead to the same results.

The sulfobromophthalein sodium excretion in infants with hemolytic disease is often retarded. Children with a sulfobromophthalein sodium excretion which is nearly normal are in a more favorable condition during the first critical days. This test therefore has a prognostic value.

FROM THE AUTHOR'S SUMMARY.

Acute Contagious Diseases

COMPARATIVE STUDY OF THE RATE OF ATROPHY OF SKELETAL MUSCLE FOLLOWING ANTERIOR RAMISECTION AND ACUTE ANTERIOR POLIOMYELITIS IN THE RHESUS MONKEY. R. E. M. BOWDEN, Bull. Johns Hopkins Hosp. **89**:153 (Sept.) 1951.

The rates of atrophy of the sartorius, gastrocnemius, and tibialis anterior muscles were studied in 11 monkeys after anterior ramisection. The rates for all three muscles appear to be similar.

The rate of atrophy of the sartorius muscle was studied in 40 monkeys with anterior poliomyelitis. Seventy muscles were available for study, and in all animals they were completely paralyzed, as judged by clinical tests and sometimes by stimulation of the motor nerve. The calculations were based upon an estimation of the weight of the muscle in the normal animal at the time of inoculation of the virus.

Bowden found that the degree and rate of atrophy of the sartorius muscle after poliomyelitis do not appear to differ significantly from those found after anterior ramisection.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

EFFECT OF PHYSICAL ACTIVITY ON PROGNOSIS OF POLIOMYELITIS. R. M. ALBRECHT and F. B. LOCKE, J. A. M. A. **146**:769 (June 30) 1951.

This study was undertaken with the purpose of determining whether the severity of poliomyelitis could be ascribed largely to the extent of physical activity at the time of illness. It was thought that a positive relation would be of major importance for one could then prevent much of the paralysis by keeping the patient in bed during the critical period.

Two hundred patients from the 1949 poliomyelitis epidemic in Nassau County, N. Y., were studied as to their physical activity from three days before to a number of days after the onset of illness, and as to the degree of residual paralysis five and one-half to seven months after onset. It was found that death and severe paralysis in children are not related to the degree of physical activity, either shortly before the onset of illness or at any time during illness. Death and severe paralysis in adults may be attributed in part to the degree of physical activity in the meningeal stage.

Albrecht and Locke point out that age is a major factor in the prognosis of poliomyelitis in that adults, irrespective of activity, are more severely affected than children. However, factors other than age and activity are of major importance in the prognosis of poliomyelitis.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

EFFECT OF TRANSPORTATION ON SEVERITY OF ACUTE POLIOMYELITIS. M. B. BRAHDY and S. H. KATZ, J. A. M. A. **146**:772 (June 30) 1951.

The harmful effect of physical activity on the severity of poliomyelitis was studied by Russell, who found that the amount of physical activity after onset of meningeal symptoms bore a direct relation to the degree of muscular paralysis. Hargreaves, in a similar analysis, confirmed the conclusions of Russell and showed also that the maximum exertion in one day after the onset of meningeal symptoms had a more deleterious effect on the prognosis of poliomyelitis than the total amount of physical activity during the entire period before hospitalization. Recently, Horstmann, in an intensive study of 411 cases from three epidemic areas, confirmed the conclusions of Russell and Hargreaves.

Suspecting that long transportation might also have a deleterious effect, the authors of the present report recorded fatality rates for a group of patients with poliomyelitis who were transported to the hospital over long distances and the fatality rates for a comparable group of patients who were transported short distances. The authors' results indicate that transportation over long distances may be harmful to a patient in the acute stage of poliomyelitis. Whether the treatment of patients during the acute stage of poliomyelitis should be decentralized or whether the methods of transportation should be improved requires further study.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

POTASSIUM DEFICIENCY IN BULBAR POLIOMYELITIS. H. S. LANS, I. F. J. STEIN, R. J. BECKER, A. L. HOYNE, and K. A. MEYER, J. A. M. A. **146**:1016 (July 14) 1951.

Paralysis of the pharyngeal musculature is frequent and troublesome in patients with bulbar or encephalobulbar poliomyelitis, resulting in difficulty or inability to swallow, associated with regurgitation. The inability to swallow necessitates intravenous and subcutaneous administration of fluids to provide nutrition and to prevent dehydration. Dehydration in patients involves not only the problem of water depletion but also that of imbalance of electrolytes. Since patients with bulbar poliomyelitis often require prolonged parenteral alimentation, the electrolyte and fluid balance of these patients becomes important.

Lans and associates studied six cases of bulbar poliomyelitis, three of which are reported here in detail. In all cases a pronounced hypopotassemia was found. Treatment of the existing deficiency with intravenously administered potassium chloride resulted in a decided improvement in the patients' condition.

Severe prolonged potassium deficiency can be fatal. This condition, when present in patients with bulbar poliomyelitis, may be a contributing factor in the high mortality rate. Proper treatment of electrolyte imbalance in these patients is essential and must include adequate potassium therapy.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

HYPOVENTILATION SYNDROME IN BULBAR POLIOMYELITIS. S. J. SARNOFF, J. L. WHITTENBERGER, and J. E. AFFELDT, J. A. M. A. **147**:30 (Sept. 1) 1951.

The gross irregularity of breathing and the ventilatory inadequacy which may be associated are part of the classic picture of bulbar poliomyelitis. When a clear airway has been insured and the respiratory defect persists, the latter is then attributable to involvement of the respiratory center. The nature of the defect may be apparent clinically in two ways: (1) gross irregularity of the rate and rhythm of respiration and (2) incoordination of the various muscles of respiration. In addition, a third, and perhaps more important, type of respiratory defect occurs.

This third type of respiratory defect in bulbar poliomyelitis, which the authors term the hypoventilation syndrome, is the subject of this paper. It consists of a decreased sensitivity of the respiratory center to the partial pressure of carbon dioxide in arterial blood. This results in lowered pulmonary ventilation, which is attributable to a diminished respiratory drive and in some ways is analogous to the situation in which the respiratory center has been depressed by an overdose of barbiturate.

Four patients with bulbar poliomyelitis were seen whose respiration was such as to include them in the category of the hypoventilation syndrome. It was found that verbal artificial respiration can be effectively administered to the patient if he is responsive and is observed continuously by competent personnel members, and if it is not required for too prolonged a period.

The administration of oxygen may possibly be hazardous under these conditions. The potential hazards, however, may be readily overcome if any significant diminution of spontaneous ventilation is reversed by some means of artificial respiration.

Electrophrenic respiration may be of help under circumstances in which spontaneous respiration is inadequate or becomes so after the administration of oxygen. At least one phrenic nerve must be uninvolved by the disease if electrophrenic respiration is to be used.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

THE TREATMENT OF SCARLET FEVER WITH PENICILLIN G ADMINISTERED ORALLY THREE TIMES A DAY. LOUIS WEINSTEIN and THOMAS S. PERRIN, J. Pediat. **37**:844 (Dec.) 1950.

The authors studied 356 patients with scarlet fever. These patients were treated with penicillin orally if the duration of infection was less than 48 hours and if no previous antibacterial therapy had been given. A buffered preparation of penicillin, 150,000 units administered every eight hours for 10 days, was effective in eradicating Streptococcus pyogenes from the respiratory tracts of these patients. This treatment reduced the incidence of suppurative complications almost to zero, although probable carditis was observed in three cases. No patients showed signs of drug sensitivity.

MACDONALD, Pittsburgh.

THE INCIDENCE OF A NORMAL SPINAL FLUID IN ACUTE POLIOMYELITIS. EDITH E. NICHOLLS, J. Pediat. **37**:894 (Dec.) 1950.

The diagnosis of acute poliomyelitis should be made from clinical observations with the aid of spinal-fluid findings. However, one should remember that poliomyelitis may occur with characteristic signs and symptoms but with normal count of spinal-fluid cells and protein. In this report, 43 (13.8%) of 320 patients with poliomyelitis had normal spinal fluid.

MACDONALD, Pittsburgh.

GASTROINTESTINAL LESIONS IN BULBAR POLIOMYELITIS. C. D. COOK, J. R. HARTMANN, S. J. SARNOFF, and W. BERENBERG, Pediatrics **7**:415 (March) 1951.

The cases of five patients with acute bulbar polioencephalitis (bulbar poliomyelitis) complicated by gastrointestinal perforation and/or hemorrhage are reported. A detailed case report is given for the one patient who recovered. An electrophrenic respirator was instrumental in maintaining this patient's respirations, and massive blood transfusions were used in preventing shock from intestinal hemorrhage.

Gastrointestinal complications of acute bulbar polioencephalitis appear to be more frequent than previously realized. A relationship between midbrain damage and gastrointestinal lesions, as emphasized by Cushing, occurring during the course of acute bulbar polioencephalitis, is postulated.

FROM THE AUTHORS' SUMMARY.

THE MANAGEMENT OF PERTUSSIS. RICHARD W. BLUMBERG, South. M. J. **44**:350 (April) 1951.

In spite of the use of immunization procedures, whooping cough continues to be responsible for a high mortality and morbidity rate among children. Infants under the age of 3 months still are not protected by these procedures. In questionable cases diagnosis must be established by bacteriologic methods. Material is best secured by nasopharyngeal swabbing. Flosdorf and Strean methods of testing skin reactions are mentioned, but not enthusiastically. The author advocates the use of aureomycin, chloramphenicol, or terramycin in dosages of 50 to 100 mg. per kilogram of body weight daily for 5 to 10 days. The dose is to be divided into four equal amounts four times a day. General measures, such as good nursing care, use of oxygen, and aspiration of the respiratory tract must not be neglected. The use of hyperimmune serum is sometimes of value.

LOGAN, Rochester, Minn.

WHOOPING COUGH EPIDEMIC IN AN URBAN NATIVE LOCATION. H. T. PHILLIPS, South African M. J. **25**:110 (Feb. 17) 1951.

One hundred three cases of whooping cough occurred in a native community. Study revealed that the incidence in vaccinated children was 2.1%, while it was 9.9% in unvaccinated persons.

McGUIGAN, Evanston, Ill.

MUMPS ENCEPHALITIS WITHOUT PAROTITIS. H. MORF and L. HOLLANDER, Helvet. paediat. acta **6**:428 (Nov.) 1951.

A case of mumps meningoencephalitis without detectable parotitis is reported. A 6½-year-old boy became ill, after contact with a person who had mumps, with a mononuclear meningitis and grave encephalitic manifestations. After a long period of semiconsciousness, he made a complete recovery. Study of the mumps complement-fixation reaction revealed a weakly positive precipitation with the V antigen. A parallel investigation in cases of mumps meningitis without parotitis and cases of epidemic parotitis revealed weakly or clearly positive results with the complement fixation reaction. In control cases without mumps reactions were not always negative, but the titer remained always low. The complement fixation reaction is a valuable help in diagnosis.

FROM THE AUTHORS' SUMMARY.

SOME CONSIDERATIONS ON IMMUNIZATION AGAINST POLIOMYELITIS. D. GOTTI, Clin. Pediat. **32**:528 (Oct.) 1950.

Building up an immunity appears to be the most hopeful means of controlling poliomyelitis, especially since chemotherapy in this disease is very likely to lead to added damage to the nerve cells.

HIGGINS, Boston.

TREATMENT OF DIPHTHERIA CARRIERS WITH PENICILLIN AEROSOL IN POLIOMYELITIS. M. SCARZELLA and G. P. SORMANO, Riv. clin. pediat. **47**:142 (Feb.) 1949.

The authors have treated with penicillin aerosol 15 diphtheria convalescents and 5 healthy carriers. They obtained sterile results, after a time varying from five to nine days, in 94% of

the first group, and in only 60% of the second group. They are not able to give definite conclusions because of the small number of patients treated. Nevertheless it is thought that this treatment offers numerous advantages and is worth adopting on a large scale.

FROM THE AUTHORS' SUMMARY.

STREPTOMYCIN IN DIPHTHERIA. ALVARO MASI, Riv. clin. pediat. **49**:761 (Oct.) 1951.

The author reports favorable results obtained in experimental diphtheria in guinea pigs through the use of streptomycin. He also reports on a clinical case of pharyngeal diphtheria treated and cured with streptomycin.

FROM THE AUTHOR'S SUMMARY.

RESULTS OF VACCINATION AGAINST DIPHTHERIA. ELORDI, CRESPO SANTILLANA, and FALCON. Acta pediat. españ. **8**:1413 (Dec.) 1950.

The authors, who are public health officials, discuss mass vaccination against diphtheria and draw the following conclusions: 1. It has proved effective in prevention of the disease in epidemic form. 2. Vaccination should be done before one year of age. 3. Combined diphtheria, whooping cough, and tetanus vaccination should be the method of choice. It should be done in child health centers because of the greater ease of control in completing immunizations. 4. If it is impossible to give the three immunizations together, alum-precipitated diphtheria toxoid should be used. This requires two injections with a month's interval between them.

The mass Shick test is of no value from the public health standpoint. All children who have been given antitoxin because of exposure to the disease should be given the immunization six weeks after the last injection of serum. Reimmunization should be done every five years, and there are practically no contraindications.

ALLEN, Santa Fe, N. M.

PROPHYLAXIS AND THERAPY OF POLIOMYELITIS. H. PETTE and R. C. BEHREND, Deutsche med. Wchnschr. **75**:1288 (Sept. 29) 1950.

Since the therapy of poliomyelitis is disappointing, efforts at prophylaxis are important. Avoidance of any physical exertion in the early stages of the disease may diminish the incidence of paralysis. Strict limitations of activity are demanded upon suspicion of the disease, particularly at times of an epidemic.

AMBERG, Rochester, Minn.

ANTIBIOTIC THERAPY IN WHOOPING COUGH: A HINT FOR PRACTICE. B. DE RUDDER and M. GERHARDT, Med. Klin. **46**:941 (Sept. 7) 1951.

Infants in the first year of life, of whom about 30% were not over 3 months old, were treated with streptomycin. The results were compared with the outcome in a similar age group before antibiotic treatment. Of 318 control patients, 17.6% died, and of 101 infants treated with streptomycin, only 6% died. Infants in the first group who were admitted to the hospital free of pneumonia numbered 201. In 30.7% of these pneumonia developed, and of these 42% died. After treatment with streptomycin was initiated, pneumonia developed in 7.6% of 66 infants, and none died. Babies with pneumonia received, in addition, other remedies, including sulfonamides and penicillin. The average duration of the disease before streptomycin medication was used was 11 weeks, and since streptomycin has been used it is 4 weeks. A number of cases was treated with chloramphenicol but not enough for evaluation.

AMBERG, Rochester, Minn.

AUREOMYCIN IN A COMPLICATED CASE OF MUMPS IN AN ADULT. E. SCHMUTTERMEIER, W. SWOBODA, and O. THALHAMMER, Wien. klin. Wchnschr. **62**:979 (Dec. 29) 1950.

In a 29-year-old man a double-sided orchitis developed as a complication of epidemic parotitis with high fever. The response to aureomycin therapy was quick and striking. The case is reported to provoke further tests with aureomycin in complicated cases of mumps.

AMBERG, Rochester, Minn.

STREPTOMYCIN TREATMENT OF WHOOPING COUGH. G. HACKZELL, Svenska läk-tidning. **47**:1181 (May 19) 1950.

Six infants, 3½ weeks to 16 months old, suffering from whooping cough with pulmonary complications, were successfully treated in 2 to 4 weeks with streptomycin in dosages of 0.3 to 0.75 mg. daily (total 9 to 16.9 mg.). There were no toxic reactions.

WALLGREN, Stockholm, Sweden.

GANGRENE OF THE LEG IN SCARLET FEVER. J. G. F. BETHE, Maandschr. kindergeneesk. **18**:55 (No. 2) 1950.

Severe postscarlatinal gangrene in a 5-year-old girl is described. Amputation of the left leg was necessary.

FROM THE AUTHOR'S SUMMARY.

REVACCINATION AND ANTIHEMAGGLUTININ PRODUCTION. W. A. COLLIER and F. H. MEYER, Nederl. tidschr. geneesk. **94**:1841 (July) 1950.

During an epidemic of smallpox in Indonesia many inhabitants were revaccinated four or five times. A deleterious effect of frequent revaccination on the antibody production was feared.

Collier and Meyer immunized guinea pigs by vaccinia vaccination and revaccinated them one month later. Different amounts of vaccine were used. A control group was vaccinated once. Antihemagglutinin titers of the sera rose higher and more rapidly upon revaccination. Use of higher concentrations of the vaccine produced better results. By applying five revaccinations at one week intervals, regular increase in the antibody titer was obtained.

If humans react in the same way, frequent revaccinations not only are harmless, but are to be recommended for those who have had contact with smallpox.

VAN CREVELD, Amsterdam, Netherlands.

STREPTOMYCIN IN TREATMENT OF WHOOPING COUGH. Z. N. KROOGLIKOVA, Pediatriya **2**:20 (March-April) 1951.

This article is based on experiments done at the Department of Infectious Diseases of the Pediatric Institute and the Whooping Cough Clinic. The author reports that streptomycin was particularly effective when given in the early stages of whooping cough if the disease was uncomplicated by other conditions.

Fifty children with whooping cough were treated with streptomycin, and the patients were classified in groups according to age and type of symptomatology, as follows: (1) whooping cough with no complications, (2) whooping cough with tuberculosis, (3) whooping cough with dysentery, and (4) whooping cough with influenza. In the uncomplicated group (1) streptomycin was effective in 16 of 19 children. Most of the children were treated in the early stages of the disease. The effect became noticeable from the third to the eighth day after initial treatment, and the symptoms diminished rapidly. The second group, whooping cough with tuberculosis, included children from 6 months to 8 years old. The author states that whooping cough ordinarily increases the tuberculous process. Also, these patients are known to have whooping cough with increased severity, regardless of the age of the patient or the stage of illness. Streptomycin proved to be effective in any stage, and the effects were rapid. In the third group, whooping cough with dysentery, which included children from 6 months to 2 years old, streptomycin had very little or no effect. In children with whooping cough and influenza or pneumonia (group 4), aged 4 to 22 months, streptomycin had no effect.

The author presents the following conclusions: 1. Small children or infants respond best to streptomycin if whooping cough is uncomplicated by other conditions. 2. Streptomycin is also effective in whooping cough with tuberculosis at various stages of the disease. 3. Streptomycin is not effective when the disease is complicated by dysentery. 4. In whooping cough with influenza and pneumonia the poor effect is due to the fact that, even in the genesis of early pneumonia, the action of streptomycin is primarily against Hemophilus pertussis.

BODER, Los Angeles.

Acute Infectious Diseases

PRENATAL MULTIPLE IMMUNIZATION. PHILIP COHEN, HERMAN SCHNECK, and EMANUEL DUROW, J. Pediat. **38**:696 (June) 1951.

The data preesnted here indicate that when women were immunized with multiple vaccines in the last trimester of pregnancy at least 80% responded with high titers of antibodies against diphtheria, whooping cough, and tetanus. Similar results were obtained with influenza vaccine. These protective titers were quantitatively and passively transferred to the newborn infants, in whom they persisted for three months or more. Reactions in the mothers were more severe with fluid vaccines than with the alum-precipitated vaccines and less severe when diphtheria toxoid was omitted from the combined vaccines. No serious reactions were encountered in either mothers or babies. Active immunization should be given to these babies at 3 to 4 months of age.

MACDONALD, Pittsburgh.

COMBINATIONS OF ANTIBIOTICS IN THE TREATMENT OF INFECTIOUS DISEASES. WILLIAM E. WELLMAN, Minnesota Med. **34**:537 (June) 1951.

The author cites several diseases in which he feels that a combination of antibiotics should be used in treatment. Patients with brucellosis are best treated by a combination of aureomycin and dihydrostreptomycin. In some cases enterococcal endocarditis can be cured by using a combination of penicillin and dihydrostreptoymcin. In cases of bacteremia, peritonitis, and meningitis, when the organism is not known a combination of aureomycin or terramycin with dihydrostreptomycin is indicated. One should remember that terramycin does not diffuse into the cerebrospinal fluid. The author concludes, first, that a definite synergism between penicillin and dihydrostreptomycin is established. Second, there appears to be an antagonistic effect between penicillin and aureomycin or chloramphenicol. Third, certain bacteria made resistant to aureomycin, to terramycin, and to chloramphenicol showed an increased resistance to all three but not to dihydrostreptomycin.

STOESSER, Minneapolis.

ACUTE RHEUMATIC FEVER TREATED WITH CORTISONE AND ACTH. HARRY L. SMITH and ARLIE R. BARNES, Minnesota Med. **34**:854 (Sept.) 1951.

Fourteen patients with acute rheumatic fever were treated with cortisone and corticotropin (ACTH). Ten patients were treated with cortisone and four with corticotropin, and the acute symptoms were controlled or suppressed in all 14 instances. The temperature returned to normal and the joints became symptom free in five days or less. The hormones did not seem to cure the disease or shorten the duration. If administration of the hormones was discontinued before the disease had run its usual course, the acute symptoms often recurred. These hormones did not render patients immune to recurrence of acute rheumatic fever. It was the authors' opinion that early and adequate administration of these hormones will probably prevent or minimize permanent cardiac injury in many patients.

STOESSER, Minneapolis.

THE Q-T INTERVAL IN RHEUMATIC FEVER. J. N. BRIGGS and S. A. DOXIADIS, Arch. Dis. Childhood **26**:311 (Aug.) 1951.

The Q-T interval was measured in 112 electrocardiograms of 82 children with rheumatic fever and of 20 normal controls. The Q-T interval was above the maximal normal limit in 8 of 68 tracings taken during active rheumatic infection, in 3 of 24 tracings of children with inactive rheumatic heart disease, and in none of the tracings obtained from the controls. There was a significant difference between the mean Q-T interval of all the children with active or inactive carditis and the control group.

It is concluded that rheumatic infection may prolong the duration of the electrical systole, but the degree of this change is such that it is of diagnostic value in only a few cases.

KELLY, Milwaukee.

TETANUS: REPORT OF 2 CASES. H. M. DOUGLAS, Clin. Rep. Adelaide Child. Hosp. **2**:19 (May-Nov.) 1951.

Two patients with tetanus were treated by tracheotomy, one of them being placed in a respirator and curarized. Both recovered, and the author feels that tracheotomy is a definite step forward in treatment. He considers the usefulness of curare not entirely proved and prefers mephenesin ("myanesin"), which controls spasms easily without affecting respiration.

McGUIGAN, Evanston, Ill.

ACTION OF PARA-AMINOBENZOIC ACID DURING THE COURSE OF SALICYLATE MEDICATION ON SALICYLATES IN BLOOD AND URINE OF WELL AND RHEUMATIC CHILDREN. M. ORLANDELLI, Clin. Pediat. **32**:145 (March) 1950.

When paraaminobenzoic acid was administered to either healthy or rheumatic children receiving salicylate medication, the salicylate level in the blood increased, although the salicylate excretion in the urine showed little change. These increases in blood salicylate did not vary in proportion to the paraaminobenzoic acid content of the blood serum.

HIGGINS, Boston.

HEPATITIS AND TYPHOID FEVER. LUIS GOMEZ OROZCO, Bol. méd. Hosp. inf., México **7**:547 (Aug.) 1950.

The author reports a case of typhoid and jaundice. The question in this case is whether the jaundice may be attributed to the typhoid or to a virus infection. Although it was not possible definitely to establish the origin from the clinical course and laboratory findings, it was thought that the jaundice may have been caused by a virus.

FROM THE AUTHOR'S SUMMARY.

Chronic Infectious Diseases

THE EFFECT OF STREPTOMYCIN ON TUBERCULOUS MENINGITIS. MARTIN G. NITSKY, NATHANIEL S. RITTER, and H. M. ZIMMERMAN, Am. Rev. Tuberc. **62**:586 (Dec.) 1950.

Three adult patients with tuberculous meningitis were treated with streptomycin intrathecally over periods varying from one to six and one-half months. While this treatment failed to produce a cure, postmortem examination revealed the relatively new entity of tuberculous meningitis with fibrosis and minimal exudation in the leptomeninges of the spinal cord. This appearance was in contrast with an active process of exudation and necrosis in the meninges of the brain stem and cerebrum. It is believed that the higher concentration of streptomycin in the spinal meninges was responsible for the healing. The favorable effect of streptomycin on the disease process when an optimum concentration reaches the affected area should stimulate efforts to deliver higher concentration to the brain stem and cerebrum.

EUGENE SMITH, Ogden, Utah.

TUBERCULOUS MENINGITIS CURED WITH STREPTOMYCIN: REPORT OF A CASE COMPLICATED BY RENAL AND URETERAL CALCULUS. J. T. AQUILINA, J. A. M. A. **147**:560 (Oct. 6) 1951.

Aquilina reports a case of bacteriologically proved tuberculous meningitis in an American Indian who recovered after a long course of streptomycin therapy. The diagnosis of tuberculous meningitis was established by culture and guinea-pig inoculation. The patient was alive and well three years after the onset of his illness.

The treatment consisted of 350.8 gm. of streptomycin administered intramuscularly over a period of 168 days and of 6.9 gm. administered intrathecally over a period of 85 days. Calculus formation was observed as a complication, necessitating pyelolithotomy and nephrostomy on the right side and, later, nephrectomy on the left. The only residuals of tuberculous meningitis were blindness in the left eye and slight weakness of the left leg.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

RESPONSE OF TUBERCULIN SKIN TEST TO ACTH AND CORTISONE IN TUBERCULOUS GUINEA PIGS. VINCENT J. DERBES, JOHN H. DENT, NEILL K. WEAVER, and DAVID D. VAUGHAN, Proc. Soc. Exper. Biol. & Med. **75**:423 (Nov.) 1950.

Fifty-one guinea pigs were infected by subcutaneous injection of tubercle bacilli recently cultured from patients with active pulmonary tuberculosis. All the animals showed definite evidence of the presence of tuberculosis, and in all the animals tested acid-fast organisms were found. The animals were divided into three groups of 17 each. One group received daily subcutaneous injections of cortisone, begun one day before injection of the tubercle organism; the second group was given various doses of corticotropin (ACTH) and cortisone, and the third group served as a control. Intradermal injections of 0.005 mg. of purified protein derivative were given. The tuberculin reaction in the treated animals did not differ significantly, either grossly or microscopically, from that of the control groups.

HANSEN, Galveston, Texas.

TUBERCULOSIS IN A GENERAL CHILDREN'S HOSPITAL. AGNES R. MACGREGOR, Edinburgh M. J. **58**:248 (May) 1951.

From the other side of the autopsy table of the Royal Edinburgh Hospital for Sick Children, Agnes MacGregor reviews childhood tuberculosis. The period covered is 1934 to 1937, the total number of autopsies, 2,559. Of these about 14% (355) had tuberculosis, and when tuberculosis was found it was usually the cause of death. Only 1.5% of all patients with tuberculous lesions died of something else, and in these children with tuberculous lesions incidental to another fatal disease, only about 25% of the lesions were healed. The rest were active, and in some miliary spread had begun. It would seem that these children were doubly doomed. Had they in some way survived, the active lurking tuberculosis waited for them.

Most deaths were in children under 3 years old, especially in the group from 6 to 18 months. Pulmonary tuberculosis was usually the primary lesion. The important secondary lesions were miliary spread (287), meningitis (259), and intestinal ulcers secondary to pulmonary lesions (69). Tuberculous meningitis was not always secondary to miliary spread. The score in this series was as follows: meningitis without detectable miliary spread, 23 cases; miliary spread without meningitis, 51 cases. MacGregor supports the controversial opinion that meningitis may be caused by direct infection of the subarachnoid from an older focus in the brain or meninges and may not be associated with general miliary spread. (Miliary spread and meningitis very often accompany each other, but not always.) These foci, not accessible to streptomycin, may be responsible for some failures in treatment.

MACDONALD, Pittsburgh.

HUMAN TOXOPLASMA INFECTION. H. JELKE, Ann. pædiat. **175**:434 (Dec.) 1950.

The cases of three patients with congenital Toxoplasma infection are discussed in detail. In two patients the infection was recent. One died 25 days post partum; in this case Toxoplasma was cultivated from the fluid after animal experiment, and later also from the brain and the spleen. In detailed anatomical examinations tissue changes typical for Toxoplasma infection were found, and isolated parasites were detected in the retina.

The second case of flora infection, in a 2-month-old girl, presented the picture of icterus accompanied by visceral symptoms. Intensive sulfonamide therapy, actually given because of an intercurrent otitis media, seemed to have contributed considerably to the cure. In the third patient, a boy 8 years old, nothing remained after a cured infection but a cerebral defect which manifested itself in spastic hemiplegia, epileptiform attacks, and mental debility. All three patients had chorioretinitis and intracranial calcifications. There was hydrocephalus in two cases and microphthalmos in one case. Antibodies against Toxoplasma could be demonstrated in all three patients, as well as in their mothers.

FROM THE AUTHOR'S SUMMARY.

EFFECT OF STREPTOMYCIN ON VARIOUS TYPES OF PRIMARY PULMONARY TUBERCULOSIS. R. BULGARELLI, Minerva pediat. **2**:189 (May) 1950.

A clinical and laboratory study of the cases of 155 children with various types of primary tuberculosis has been made.

HIGGINS, Boston.

USE OF TREPONEMIC AND LIPID ANTIGENS IN SEROLOGIC DIAGNOSIS OF CONGENITAL SYPHILIS. B. NUNZIATA, Pediatria **59**:540 (July) 1951.

More positive reactions were elicited in blood of patients with congenital syphilis when a treponemic antigen was used than when a lipid antigen was used. On the other hand, in adults with acquired syphilis the lipid antigen was the more sensitive.

HIGGINS, Boston.

FOCUS OF CONTAGION IN PRIMARY TUBERCULOSIS INFECTION. JORGE E. HOWARD and RAUL MATTE L., Rev. chilena pediat. **21**:256 (June) 1950.

A study was undertaken to demonstrate the source of infection in 985 tuberculous children. In 48% of the children the source was found, the mother being the most important individual agent, especially among the younger ones.

FROM THE AUTHORS' SUMMARY.

DIAGNOSTICALLY ATYPICAL CASES OF CONGENITAL SYPHILIS. A. BORSCHE, Deutsche med. Wchnschr. **76**:1008 (Aug. 17) 1951.

Since in the last years of the war and after the war the number of infants with congenital syphilis has increased rather considerably, it was considered desirable to call attention again to more or less atypical cases. In some persons, clinical manifestations were present while serologic reactions were negative. In one case the serologic reaction became weakly positive at the age of 20 months. It can also happen that clinical symptoms are absent while the serologic reactions are positive. A case is reported in which the clinical symptoms were such as to demand a diagnosis of congenital syphilis, although further investigation, including serologic tests of the parents, proved the diagnosis erroneous.

AMBERG, Rochester, Minn.

CEREBROSPINAL FLUID DIAGNOSIS OF TUBERCULOUS MENINGITIS. ERICH HEUCKEROTH, Med. Klin. **45**: 1425 (Nov. 10) 1950.

Staining tubercle bacilli in pellicles from spinal fluid was successful in less than 50% of cases of tuberculous meningitis. When the pellicle from fluid was obtained by cisternal puncture, tubercle bacilli could be demonstrated in all of 34 cases upon first examination.

AMBERG, Rochester, Minn.

TOXOPLASMA INFECTION. HORST JUPTNER, Med. Klin. **46**:789 (July 20) 1951.

This paper gives a rather short but good review of toxoplasma infection.

AMBERG, Rochester, Minn.

TOXOPLASMA INFECTION. E. CUBONI, Wien. klin. Wchnschr. **63**:272 (April 13) 1951.

Various diagnostic measures are discussed, including transfer to animals of infected material. It is recommended to use, if possible, mice, guinea pigs, rabbits, and hamsters. The transfer to chicken embryo has advantages. Various serologic tests are discussed and evaluated. Skin reaction with toxoplasmin and with antigen obtained from the peritoneal exudate of an infected mouse or from the chicken chorioallantois is regarded as of questionable diagnostic value.

AMBERG, Rochester, Minn.

OCCURRENCE OF MENINGOCOCCAL MENINGITIS IN CHILDREN WITH TUBERCULOUS MENINGITIS. K. CHOREMIS, N. ZERVOS, B. KONSTANTINIDES, and S. PANTAZIS, Acta Soc. pediat. hellen. **3**:1, 1949.

In six children meningococcal meningitis developed during streptomycin treatment for tuberculous meningitis, and three of them died. In only one child was the prognosis of the tuberculous meningitis definitely unfavorable before the appearance of the second infection. It is believed that the inflamed meninges are particularly predisposed to the establishment of meningococci, and it is suggested that patients with meningococcal infections should not be treated in the same wards with those suffering from tuberculous meningitis.

DOXIADIS, Sheffield, England.

COMPARISON OF TUBERCULIN SENSITIVITY DURING AND AFTER TREATMENT WITH STREPTOMYCIN. D. H. BEZOS, Acta Soc. pediat. hellen. **3**:17, 1949.

An intradermal tuberculin test was done on seven children suffering from tuberculous meningitis seven days before and 28 hours after a temporary interruption of streptomycin treatment. In all children the reaction was greater when the use of streptomycin was discontinued.

DOXIADIS, Sheffield, England.

ABSORPTION, DISTRIBUTION, AND EXCRETION OF STREPTOMYCIN IN TUBERCULOUS MENINGITIS. S. CHAROCOPOS, J. MARGARITIS, and A. ZAPHIRIS, Acta Soc. pediat. hellen. **3**:193, 1949.

Streptomycin levels were estimated in blood, cerebrospinal fluid, fluid of pleural and peritoneal effusions, bile, urine, and feces of 49 children with tuberculous meningitis and 19 children with other tuberculous disease. In all, 346 determinations were done at various intervals after intramuscular, intravenous, intrathecal, and oral administration of streptomycin. The value of these determinations for assessment of treatment and prognosis in each treated case is discussed.

DOXIADIS, Sheffield, England.

Diseases of Blood, Heart and Blood Vessels and Spleen

THROMBO-EMBOLISM IN CHILDREN. PAUL T. DECAMP, ALTON OCHSNER, and MICHAEL DE BAKEY, Ann. Surg. **133**:611 (May) 1951.

An analysis of 35 cases of acute thromboembolism in children, occurring at Charity Hospital of Louisiana in New Orleans during a 12-year period ending June 30, 1950, is presented. The incidence of fatal cases in children is much lower than in the adult. The highest incidence was in early childhood. Major precipitating factors are essential for thrombosis to develop in children. Newborn infants are particularly susceptible to such precipitating factors as infection, dehydration, malnutrition, and circulatory stasis.

Nonseptic peripheral thrombosis was rarely encountered in the series. Visceral thrombosis was common. Heart disease was a significant cause of thrombosis in older children. The incidence of thrombosis in children has diminished over the 12-year period, primarily because of control of infection. The incidence should be further reduced as the principles and techniques of hydration, nutrition, and control of infections are applied more vigorously.

BANTIN, Omaha.

THE SKELETAL LESIONS OF LEUCEMIC CHILDREN TREATED WITH AMINOPTERIN. FELIX E. KARPINSKI JR. and JAMES F. MARTIN, J. Pediat. **37**:208 (Aug.) 1950.

Thirty-five children with acute leukemia were included in this study. Osteolysis of the skull was observed in six children. Twenty-seven showed lesions of the long bones. The most common site for these lesions was at the ends of the long bones. The changes included osteolysis, subperiosteal new-bone formation, and transverse bands of diminished density at the ends of the bones. These transverse bands were the most common lesions seen. Transverse bands of increased density at the ends of the long bones were also seen in five patients.

There is no certainty that "aminopterin" (4-aminopteroyl glutamic acid, a folic acid antagonist) has a specific effect on any of these bone changes. The authors watched one destructive lesion disappear in a patient during "aminopterin" therapy. Such lesions may be reversible during a remission of the disease, whether it is spontaneous or induced. They believe this to be true because they observed new bone lesions develop and old lesions progress in other patients receiving "aminopterin," and there was no correlation between the response of these lesions and the clinical and hematological response to the drug.

The heavy transverse bands of increased density at the ends of the long bones may, they think, represent evidence of improvement in the general nutrition of the bone. These bands were seen in patients treated with "aminopterin" and in patients untreated. The bands were transient and became less prominent as the disease progressed.

MACDONALD, Pittsburgh.

PULMONOCARDIAC FAILURE. W. F. O'CONNELL and Y. C. LEE, Pediatrics **7**:394 (March) 1951.

Pulmonocardiac failure is a syndrome caused by thoracic and/or spinal deformities. It is characterized by progressive respiratory difficulty and terminal cardiac failure. Outstanding features are diminished thoracic volume due to the deformity, habitual dyspnea, and progressive enlargement of the right ventricle. Pulmonary resistance and pulmonary arterial pressure are increased. Pathologic findings consist of small lung volume and marked right ventricle hypertrophy and dilatation. Notable is the absence of any significant pulmonary vascular or fibrotic change.

A case occurring in childhood, with severe congenital anomaly of the diaphragm and spine and early onset of fatal respiratory and cardiac failure, is presented.

FROM THE AUTHORS' SUMMARY.

CIRCULATING EOSINOPHILES IN HEALTH AND DISEASE. KATHARINE HAIN, Pediatrics **7**:408 (March) 1951.

A total of 351 circulating eosinophile counts were done on 75 children. The range of circulating eosinophiles for 18 normal children was 109 to 359. In 12 patients with nonfebrile miscellaneous diseases, the circulating eosinophile counts ranged from 84 to 599, and in 3 patients with mild febrile illnesses, from 170 to 341. A possible explanation for the fact that these counts fell within the normal range was discussed.

In 29 patients with acute febrile illnesses the initial circulating eosinophile counts ranged from 0 to 97. Serial counts during convalescence on three of these patients are presented and the prognostic significance discussed. In 10 patients with various allergic manifestations, there was a range of 393 to 2,665. Serial counts for one patient with acute atopic eczema treated with corticotropin (ACTH) are presented.

Serial counts for one patient before and after laparotomy are presented. The responses of children with miscellaneous diseases to test doses of corticotropin, epinephrine, and insulin are also presented.

FROM THE AUTHOR'S SUMMARY.

ENDOCARDIAL SCLEROSIS: REVIEW OF CHANGING CONCEPTS WITH REPORT OF 6 CASES. H. W. EDMONDS and W. B. SEELYE, Pediatrics **7**:651 (May) 1951.

Six cases of heart disease are presented. They are representative of a syndrome characterized pathologically by hypertrophy of the left side of the heart, thickening of the mural endocardium of the left ventricle, and varying distortion of the aortic and mitral valves, and characterized clinically by roentgenologically demonstrable cardiac enlargement, nondiagnostic murmurs, and sudden death in infancy. The older concept of an inflammatory pathogenesis (so-called fetal endocarditis) is rejected in favor of developmental origin of the lesions.

FROM THE AUTHORS' SUMMARY.

SARCOMA OF THE HEART IN A CHILD. E. G. G. ROBERTS and R. M. E. SEAL, Arch. Dis. Childhood **26**:308 (Aug.) 1951.

A case of fibrosarcoma of the heart, probably primary, with involvement of bones, lung, and other organs is described in a 3-year-old child.

KELLY, Milwaukee.

GENERALIZED EOSINOPHILIC GRANULOMA. W. KINTZEN and R. WEBER, Ann. Pædiat. **177**:329 (Dec.) 1951.

The authors report two cases of fatal generalized eosinophile granuloma, one in a boy 3½ months old and one in a man of forty. Generalized eosinophile granuloma may have a fatal outcome without showing transitional changes towards a lymphoma (Abt-Letterer-Siwe reticulosis) or towards a lipid histiocytosis of the cholesterol type (Schüller-Christian disease). At present it cannot be ascertained with any certainty what role the adrenal cortex plays in the course of eosinophile granuloma. In the second case reported an isolated atrophy of the zona glomerulosa in the cortex was found, and the skin showed marked hyperpigmentation.

FROM THE AUTHORS' SUMMARY.

ELECTROPHORETIC STUDIES ON SERUM PROTEINS OF WELL AND PREMATURE INFANTS. C. IMPERATO, Lattante **22**:449 (Aug.) 1951.

Assays were made for albumin and alpha, beta, and gamma globulins in the sera of 36 infants, aged between 32 hours and 2 years. During the first few weeks of life, an absolute decrease in the total protein and the albumin of the serum was found; during this same period, the alpha globulins showed a relative increase and the beta and gamma globulins a relative decrease in amounts. There continued to be a gradual decrease in the gamma-globulin content of the serum until the infants were between 3 and 5 months old; after this age, there was a progressive increase in the gamma-globulin content of the serum.

HIGGINS, Boston.

ANOMALIES OF PULMONARY VEINS: DIFFERENT VARIETIES: IMPORTANCE OF ANGIOCARDIOGRAPHY IN DIAGNOSIS. AGUSTIN CASTELLANOS, Arch. med. inf. **20**:217 (Oct., Nov., Dec.) 1951.

The author calls attention to the frequency of anomalies of the pulmonary veins, and he makes a new classification, modifying the terminology introduced by Brody, with the object of better depicting the different types or varieties of these anomalies. He also calls attention to the value of angiocardiography, especially the levoangiocardiogram, in the diagnosis of several anatomic varieties. By means of angiocardiography, he believes, it is possible to make an intra vitam diagnosis of some of the anomalies of the pulmonary veins, even though at present many of the varieties may not be benefited by this method of roentgenological exploration.

FROM THE AUTHOR'S SUMMARY.

ACUTE GAUCHER'S DISEASE IN AN INFANT. LUIS BARRERAS, Arch. med. inf. **20**:256 (Oct., Nov., Dec.) 1951.

The author presents a case of acute Gaucher's disease (lipid histiocytosis of the kerasin type) in an infant (the second Cuban case). The most evident symptoms were giant splenomegaly, hepatomegaly, anemia, malnutrition, and a neurological syndrome (tetanic phase, trismus, crisis of the hypertonia of the extremities, and of laryngospasm). Gaucher's cells were demonstrated in the material obtained by external puncture of the spleen, and a photomicrograph of these findings is presented. Roentgenologic study of the skeleton revealed no abnormalities. Treatment with elevated doses of water-soluble vitamin A ("aquasol" A), orally or intramuscularly, did not modify the evolution of the disease.

FROM THE AUTHOR'S SUMMARY.

TREATMENT OF INFECTIOUS MONONUCLEOSIS. G. DAMM and E. FREY, Deutsche med. Wchnschr. **76**:1182 (Sept. 21) 1951.

Three patients, aged 16 to 20, with infectious mononucleosis with ulcers and membrane formation in the throat responded well to terramycin treatment.

AMBERG, Rochester, Minn.

HEMOBLASTOSIS IN CHILDHOOD. V. J. MATHESIUS, Pediat. listy **6**:38 (No. 1) 1951.

Leukemia in a 3-year-old boy is reported. During the two-year course of the disease the main clinical features were recurring thrombocytic and leucocytic crises without any signs of hemoblastosis. The disease ended fatally as hemoblastosis with undifferentiated stem cells.

FROM THE AUTHOR'S SUMMARY.

Diseases of Nose, Throat, and Ear

DEAF-MUTISM IN CHILDREN. E. FASSER, South African M. J. **25**:145 (March 3) 1951.

The author notes that in the vast majority of cases of deaf-mutism, the pathogenesis is genetic in origin, with the mutism secondary to the deafness. In a minority of cases the cause is infection in the early postnatal period. Rubella in the mother in the early months of pregnancy plays a minor and relatively insignificant role. Diagnosis should be made as early as possible, and aphasia should be distinguished from deafness.

Instruction in lip reading, individual tutoring, the use of hearing aids, and social aid in the family should be started as early as possible.

MCGUIGAN, Evanston, Ill.

CHRONIC NASOSINAL AFFECTIONS IN CHILDHOOD. AUGUSTO LATORRE AGUERO, Rev. chilena pediat. **21**:409 (Sept.) 1950.

Chronic disease of the sinuses is frequently found in childhood, although generally the correct diagnosis is not made and they are classified as chronic rhinitis. From the pathological standpoint one can distinguish three different types of chronic sinus conditions: the hyperplastic form, the purulent or bacterial type, and the mixed or hyperplastic-purulent type.

The hyperplastic form is characterized by a thickening of the mucosa of the perinasal cavities, without a concomitant purulent secretion. Apparently, in the great majority of the cases, this type is of an allergic nature, and the symptoms are those characteristic of this condition: nasal obstruction, rhinorrhea, spasmodic sneezing, and epiphora. The purulent type is characterized by an abundant purulent rhinorrhea. This form frequently gives rise to bronchopulmonary complications, especially to a chronic bronchitis, due to the fact that the lower respiratory tree receives the nasal secretions that descend by the rhinopharynx to the trachea and bronchi, especially during sleep. The mixed form is a combination of the above-mentioned forms. Diagnosis is based principally on history, anterior and posterior rhinoscopy, puncture and lavage of the maxillary sinus, and roentgenologic examination. Sometimes the diagnosis must be based on other examinations, such as elimination of contrast mediums or investigation of the eosinophiles in the nasal secretion.

The treatment of the hyperplastic allergic forms should be done by an otolaryngologist in collaboration with an allergist. In the purulent forms treatment should aim at trying to establish a proper drainage, relieve nasal obstruction, and eliminate all other foci. Many times these purulent forms must be treated as conservatively as possible, trying only to obtain a good drainage by simple procedures. Only in exceptional cases and when dentition is practically complete (14 to 16 years old) can more radical surgery, such as the Caldwell-Luc or the Ermiro de Lima techniques be used. The sulfonamides and antibiotics are of little value in the chronic sinus conditions whether administered orally, intramuscularly, or locally, in contradistinction to the response in the acute forms, in which the use of these drugs is followed by great improvement.

FROM THE AUTHOR'S SUMMARY.

LARYNGEAL STRIDOR AND HYPERTROPHIED THYMUS. J. A. DE LA TORRE, Bol. méd. Hosp. inf., México **7**:887 (Dec.) 1950.

Congenital inspiratory stridor in a 5-months-old boy is reported. Roentgenologic study, both plain and with pneumomediastinum, revealed moderate hypertrophy of the thymus. Endoscopy disclosed flaccidity of the right arytenoid cartilage and slight tracheal stenosis. Following radiation the stenosis disappeared, and there was a prompt and definitive improvement of the stridor. A control laryngoscopy showed the persistence of the laryngomalacia.

FROM THE AUTHOR'S SUMMARY.

X-RAY THERAPY OF ADENOIDS IN INFANTS. R. CLEMENT, R. BOURDON, and MOULINARD, Pédiatrie **38**:575 (No. 6) 1949.

The authors have used x-ray therapy in cases of hypertrophy and infection of the adenoids in infants who presented breathing or feeding difficulties for a number of years, and they report good results and no damaging effects. They prefer this method to surgery or radium therapy. They checked their results by roentgenograms with a radiopaque medium.

GLASER, Jerusalem, Israel.

OTITIS IN SMALL CHILDREN DUE TO HEMOPHILUS INFLUENZAE. GUNNAR BJUGGREN and GÖSTA TUNEVALL, Svenska läk-tidning. **47**:433 (Feb. 24) 1950.

The authors have studied bacteriologically and clinically 178 children suffering from otitis. They stress the high incidence of Hemophilus influenzae otitis in children under 3 years of age. The otitis usually is successfully treated with sulfonamide compounds and penicillin but has a great tendency to relapse, probably due to remaining foci in the nose and its cavities.

WALLGREN, Stockholm, Sweden.

TREATMENT OF PSEUDOCROUP. NILS L. MALMBERG, Svenska läk.-tidning. **47**:797 (April 6) 1950.

A report of 980 patients with laryngismus stridulus (pseudocroup), treated at the Municipal Hospitals, Gothemburg, Sweden, from 1938 to 1949, is presented. In 34 cases tracheotomy was required and performed, with 15 fatalities. Of 12 operated upon in 1949 only 2 died. The total mortality rate was 2%. The importance of intensive treatment with the sulfonamides and penicillin, early tracheotomy in severe cases, and careful postoperative supervision is stressed. If respiratory difficulties arise after tracheotomy, bronchoscopy with suction should be performed and roentgenograms made of the lungs in order to detect or exclude pneumothorax.

WALLGREN, Stockholm, Sweden.

HEMOPHILUS INFLUENZAE B LARYNGITIS. JAN BARR, Svenska läk.-tidning. **47**:806 (April 6) 1950.

Of 421 patients with infectious laryngitis treated between 1939 and 1948 at the Fever Hospital in Stockholm, 35 had the type called malign fulminant (acute) laryngotracheitis. Among these 35 there were 13 with supraglottic edema. In one case Hemophilus influenzae was found. Early tracheotomy is recommended.

WALLGREN, Stockholm, Sweden.

Diseases of Lungs, Pleura and Mediastinum

ROENTGENOLOGIC PICTURE OF THE HILUS OF THE LUNGS. H. HERZOG and H. WISSLER, Helvet. paediat. acta **6**:406 (Nov.) 1951.

The normal hilum shadow of sagittal roentgenograms is a summation effect of various shadow-casting structures, primarily arteries of the lung. The individual structures are recognized by means of stereoscopic roentgenograms and especially by tomograms in thin layers. These vessels, which cause the hilum shadow normally, show a great variability in regard to thickness, position, and branching, and therefore the extremes within the norm must be taken into consideration. Analysis of hilum structures are demonstrated by the authors with the aid of several examples.

FROM THE AUTHORS' SUMMARY.

BRONCHIAL FOREIGN BODY. SERGIO FUENTES CRUZ, Arch. med. inf. **20**:263 (Oct., Nov., Dec.) 1951.

The author presents the case of a 6-year-old boy with a foreign body in the bronchus, which is considered interesting for the absence of clinical symptoms. The foreign body, a common nail, was 1½ in. (3.8 cm.) long and was located in the right bronchus, with the head downwards. Extraction was effected in one and one-half minute, with no following complications. The localization of the nail was proved roentgenographically, and it did not occasion any valvular trouble in the aspiration or expelling of air; consequently there were no symptoms present upon physical examination.

FROM THE AUTHOR'S SUMMARY.

Diseases of Gastrointestinal Tract, Liver, and Peritoneum

INTESTINAL OBSTRUCTION ASSOCIATED WITH FIBROCYSTIC DISEASE OF THE PANCREAS. JAMES D. ROGERS, ARCHIE H. BAGGENSTOSS, JAMES E. MUSGROVE, and ROGER L. KENNEDY, Minnesota Med. **34**:1075 (Nov.) 1951.

Intestinal obstruction in infants with fibrocystic disease of the pancreas may be caused by inspissated meconium, by volvulus, by peritoneal bands, and by intestinal stenosis or atresia.

Until recently ileus due to meconium has generally been a fatal disease of infants, associated with pancreatic insufficiency. However, many reports have neglected to observe the existence of pancreatic disease in intestinal obstruction of this nature since the condition was first described in 1905. Three cases of intestinal obstruction associated with fibrocystic disease of the pancreas encountered at the clinic were reviewed. The surgical technique and the plan for postoperative care recently developed by Hiatt and Wilson for infants with ileus due to meconium has been successful in several patients with this condition.

FROM THE AUTHORS' SUMMARY.

ANORECTAL MALFORMATIONS. ANTONIO RIGHINI, Riv. clin. pediat. **49**:723 (Oct.) 1951.

The author, after having considered the embryology of the organs in question, gives his classification of anorectal malformations, with an anatomical and clinical description of the various types. Various possibilities and the difficulties presented by the diagnosis are discussed, and the author describes surgical therapy, criticizing the proctoplastic procedure ordinarily used even in more pronounced malformations. In conclusion he describes his experiences with 40 cases of anorectal malformations.

FROM THE AUTHOR'S SUMMARY.

Nervous Diseases

CASE REPORT AND SURVEY OF BRAIN TUMORS DURING THE NEONATAL PERIOD. L. ARNSTEIN, E. BOLDREY, and H. C. NAFFZIGER, J. Neurosurg. **8**:315 (May) 1951.

The authors report a case of cavernous angioma of the choroid plexus in a 3-day-old infant. Operation was performed, and death occurred on the second postoperative day.

In a review of the literature of cases of brain tumor occurring during the neonatal period, the tumors were found to be more frequently supratentorial than infratentorial, and about half of those reported appear to have been gliomas. Hydrocephalus appears to have been the only condition common to most of the cases reported in this period, and this was not invariably present. All the cases reported showed a uniformly short course and a poor prognosis.

The presence of tumors during the neonatal period is regarded as supportive evidence for the "embryonal-rest" theory of the genesis of certain intracranial neoplasms. The pathologic nature of the lesions reported lends further support to this thesis.

ALPERS, Philadelphia [A. M. A. ARCH. NEUROL. & PSYCHIAT.].

INTRAUTERINE MENINGITIS AS A CAUSE OF HYDROCEPHALUS. R. M. N. CROSBY, W. H. MOSBERG JR., and GEORGE W. SMITH, J. Pediat. **39**:94 (July) 1951.

This is a report upon a 3-day-old infant with hydrocephalus. The hydrocephalus had been seen by roentgenogram before delivery, and it was later confirmed by ventriculogram. Upon exploration at the age of 2 months, a thick, spongy, subarachnoid exudate yielded pure cultures of Micrococcus pyogenes aureus. The spinal fluid had previously showed a quantitative protein content (Pandy) of 123 mg. per 100 cc. and no white blood cells. The authors suggest that the inflammatory process was walled off. The suggested cause of the infection was extraction of one of the mother's molars during the third month of pregnancy or maternal upper respiratory infections during the sixth and seventh months of pregnancy.

MACDONALD, Pittsburgh.

ARNOLD-CHIARI DEFORMITY OPERATED UPON AND CURED. P. JOSSERAND and R. ANNINO, Pédiatrie **38**:618 (No. 6) 1949.

In a child 11 years old who presented symptoms of increased intracranial pressure, an obstruction of the flow of spinal fluid through the fourth ventricle by a malformation of the lower part of the cerebellum was diagnosed and successfully operated upon.

GLASER, Jerusalem, Israel.

CEREBRAL SPASTIC INFANTILE PARALYSIS IN CHILDREN: ELECTROENCEPHALOGRAPHIC AND PNEUMOENCEPHALOGRAPHIC STUDY. P. DURAND and LINDA GROSSI-BIANCHI, Lattante **22**:472 (Aug.) 1951.

Electroencephalic and pneumoencephalographic studies were made on 10 children with cerebral spastic infantile paralysis. In children with focal or generalized lesions, both methods of study were useful and revealed remarkable agreement as to the location and nature of the pathology. With cerebellar lesions, the results of these tests were usually very uncertain.

HIGGINS, Boston.

VIRUS MENINGITIS. G. GELLI, Riv. clin. pediat. **49**:705 (Oct.) 1951.

After a report on the present status of virus meningitis in relation to the so-called "sterile cerebrospinal fluid" meningitis, two cases of benign lymphocytic choriomeningitis are described. In these two cases it was possible to reproduce the disease in guinea pigs. A third case of meningoencephalitis which ended in death is also reported, but it was impossible, with available means, to arrive with absolute certainty at a diagnosis beyond the generic one of virus meningoencephalitis. Histopathological findings obtained from laboratory animals are reported.

FROM THE AUTHOR'S SUMMARY.

CONGENITAL SPASTIC PARALYSIS TREATED WITH PARPANIT. TORBEN JERSILD, Acta pædiat. **39**:51, 1950.

A brief account of the chemistry, pharmacology, and mode of action of caramiphen ("parpanit") is given, and four cases of Little's disease treated with this drug are reported. Three of the patients who had extrapyramidal disturbances in addition to spasticity, responded well to the treatment, whereas one who had spasticity alone, was not affected.

Caramiphen treatment does not supersede other treatments of Little's disease, but in suitable cases it is a valuable supplement.

FROM THE AUTHOR'S SUMMARY.

SERIOUS BIRTH INJURIES OF BRAIN AFTER NORMAL FULL-TERM DELIVERY. CORNELIA DE LANGE, Acta pædiat. **39**:179 (No. 3) 1950.

Two further cases are reported, confirming the author's opinion that a normal delivery at full term does not preclude serious intracranial birth injuries.

FROM THE AUTHOR'S SUMMARY.

TRAUMATIC CHANGES IN THE BRAINS OF SPONTANEOUSLY DELIVERED CHILDREN. C. DE LANGE and B. BROUWER, Nederl. tijdschr. geneesk. **93**:3802 (Nov. 5) 1949.

Attention is drawn to the fact that traumatic changes in the brain (such as microgyria, demyelination, formation of fat cells) occur also in noninstrumental delivery at term.

The clinical history and pathology in three cases are presented. One patient had lesions in the diencephalon. Four other patients showed similar changes in the brain. For one of the patients, a boy, the clinical history pointed strongly toward a brain trauma at birth: There were drowsiness, opisthotonos and convulsions, and mental retardation. Death followed an episode of hyperpyrexia at the age of 10 months. Careful examination of the brain, however, did not show any traumatic lesion.

The authors are of different opinions concerning whether the children showing signs of intracranial hemorrhages should be operated upon or not. De Lange considered the danger of restarting the hemorrhage by puncture through the most lateral part of the fontanel a great risk. Brouwer, however, stressed the importance of the possibility of an early diagnosis by this method. The systematical removal of blood from the arachnoidal space may preserve the cortex from damage.

VAN CREVELD, Amsterdam, Netherlands.

STUDY OF CEREBROSPINAL MENINGITIS IN CHILDREN. YUNG-EN KAO, Chinese M. J. **66**:683 (Dec.) 1948.

Yung-En Kao reports 114 patients with cerebrospinal meningitis. Almost two-thirds of this group were under 5 years. Meningococci were found in 105 cases, pneumococci in 8 cases, and staphylococci in 1 case. Patients were treated with (1) antimeningococcus serum, (2) antimeningococcus serum and sulfonamides, (3) sulfonamides, (4) penicillin, and (5) sulfonamides and penicillin. Mortality rates were meningococcic meningitis, 19.09%; pneumococcic meningitis, 75%. The one patient with staphylococcic meningitis recovered.

Combinations of antimeningococcus serum and sulfonamides and penicillin and sulfonamides were equally effective in cases of meningococcic meningitis. Either method was superior to the use of sulfonamides alone.

MACDONALD, Pittsburgh.

Psychology and Psychiatry

THEORETICAL ASPECTS OF FRONTAL LOBOTOMY AND SIMILAR BRAIN OPERATIONS. PAUL H. HOCH, Am. J. Psychiat. **106**:448 (Dec.) 1949.

Inasmuch as intercurrent diseases often have a beneficial influence on mental sickness, the question arises whether frontal lobotomy may not be viewed as a traumatizing factor rather than as a specific therapeutic procedure. The answer is that frontal lobotomy and similar operations which interrupt cortical connections cannot be replaced by any type of brain operation. Venous ligation of the frontal lobe was tried in a number of patients without alteration of symptoms. Other operations on various parts of brain yielded little or no relief.

After a discussion of the psychodynamics of the frontal lobe, Hoch concludes that under no other procedure than lobotomy can a permanent block or reduction of the sensory impulses to the brain be attained; and in mental disease, although the operation is followed by changes in personality, such changes are an improvement over the condition of these patients prior to lobotomy. The "don't care" attitude, day-to-day happy living in equanimity indicative of a reduction in the depth of emotional experience, is not necessarily due to intellectual deterioration from brain damage, although the possibilities for such a phenomenon cannot be entirely dismissed. Present knowledge is insufficient for full evaluation of the many components which make up the personality of even a "normal" individual, and in the psychotic patient the standard tests are frequently useless.

Total return to normalcy of patients with mental aberration is seldom achieved under any regimen of therapy. The author observes that even in those patients who show good results from psychotherapy many fundamental aspects of their personality organization which were related to their mental symptoms remain unaffected by the therapy. Hoch believes that frontal lobotomy not only is an important tool in the treatment of clinical mental disorders but is also of great theoretical importance.

JAHR, Omaha.

THE CLINICAL MANAGEMENT OF THE MENTALLY RETARDED CHILD AND THE PARENTS. REYNOLD A. JENSEN, Am. J. Psychiat. **106**:830 (May) 1950.

This is an excellent discussion of the problem of the mentally defective child and the way in which the pediatrician may help toward the alleviation of one of the most difficult family dilemmas. The approach is sympathetic but realistic. The article should be read in the original by every pediatrician.

JAHR, Omaha.

CERVICAL ARTERIOVENOUS ANASTOMOSIS IN TREATMENT OF MENTAL RETARDATION, CONVULSIVE DISORDERS AND CEREBRAL SPASTICITY. CHARLES F. MCKHANN, W. DEAN BELNAP, and CLAUDE S. BECK, Ann. Surg. **132**:162 (Aug.) 1950.

This operation was designed to increase the arterial blood supply to the cortex of the cerebrum through production of an arteriovenous anastomosis between one of the carotid arteries and the internal jugular vein, with ligation of the jugular vein proximal to the anastomosis. The procedure was undertaken with the thought that there might be present, in some conditions, viable brain cells enmeshed in a gliotic process and that the function of these cells possibly could be improved by increasing the blood supply to the brain.

The paper reports the results of the operation in 125 patients. About 35% of children with mental retardation, convulsive disorders, and cerebral palsy, and a small percentage of adults with cerebrovascular accidents and other complications secondary to cerebral arteriosclerosis have shown postoperative benefit. The procedure is still receiving rather extensive trial and should be considered as representing a new approach to the problem rather than an acceptable and complete solution.

BANTIN, Omaha.

PSYCHOLOGIC DYSFUNCTION IN CHILDREN. T. ROBERT JACOBSON and HELEN GAY PRATT, J. Nerv. & Ment. Dis. **109**:330 (April) 1949.

The psychologic examination makes possible the evaluation of the qualities of attention, concentration, and interests, and of the emotional reactions which interfere with adequate adjustment in the problem-solving situation.

One hundred fifty school children with academic difficulties were studied over a period of two years. Many of the youngsters labeled stupid or mentally defective were found by means of the psychobiologic tests to be simply careless, hiding behind the cloak of stupidity in order to escape responsibility. The pattern has much in common with schizophrenia in that there is a flight of ideas with irrelevant replies to questions—impulsive, unrestrained verbalism leading to no particular goal. Mental laziness had become a bad habit unconsciously cultivated as a means of obtaining attention on an infantile level of behavior. These children likewise clung to their intellectual infantilism in an unconscious hope of maintaining their dependence.

With proper understanding and gentle but firm guidance and encouragement many of these children can be helped toward adequate mental adjustment. Illustrative cases are presented to stress the importance of proper diagnosis and therapy.

JAHR, Omaha.

PEDIATRICS AND CHILD PSYCHIATRY. ARNOLD GESELL, Pediatrics **4**:670 (Nov.) 1949.

The concepts and procedures of present-day child psychiatry have been largely derived from the psychopathology of adults. Clinical pediatrics as a form of preventive medicine, however, is chiefly concerned with the protection of normal child development. The conservation of mental health begins with the supervision of nutrition and physical welfare. This supervision should be broadened to include the mental growth and personality formation of the growing child. This can be accomplished through periodic developmental diagnosis and child and parent guidance.

Behavior is the most inclusive index of developmental status. Developmental diagnosis is a pediatric form of clinical neurology which uses graded functional tests of behavior to determine the maturity and integrity of the central nervous system. These tests are necessary for the diagnosis of normality, and they are indispensable for differential diagnosis of innumerable deviations and handicaps, including blindness, deafness, cerebral spastic infantile paralysis, convulsive disorders, amentia, and retardations. In the severe forms of behavior disorder and disease, pediatrics will need the specialized insights and skills of child psychiatry, but developmental pediatrics is oriented to the protection and promotion of positive health. Its principles and methods must be based upon a clinical science of normal child development.

FROM THE AUTHOR'S SUMMARY.

EFFECT OF THE CAROTID-JUGULAR-ANASTOMOSIS OPERATION UPON INTELLIGENCE. JANE W. KESSLER, Pediatrics **8**:475 (Oct.) 1951.

The psychologic findings on 33 children after the carotid-jugular-anastomosis operation had been performed on them are reported. The results show that almost all the patients improved in mental age but only at the same rate, in comparison with the chronologic age, which was evident prior to the operation. There was one instance of significantly increased rate, with an I. Q. improvement of 18 points, and one instance of significantly decreased rate, with an I. Q. loss of 20 points. The average difference in I. Q. following surgery was slight and in a minus direction.

Certain sources of confusion in evaluating intellectual changes are discussed. A change in I. Q. within 10 points sometimes occurs with repeated tests for no specific reason beyond the measuring error inherent in the intelligence test. The mere fact of improved functioning in a child means little so far as evaluating surgical intervention is concerned, since most children are still in the process of growth, although it may be slow. Moreover, individual I. Q.'s obtained before the chronologic age of 3 years should be interpreted with discretion; this is particularly true in the case of spastic children, who, in standard tests, are unfairly handicapped on a purely physical basis.

On the basis of the data reported in this study, the previous claim that "this procedure represents the first successful attempt at correction of mental retardation on an organic basis" is not justified. Although in previous reports by Beck, McKhann, and Belnap, the concept of the I. Q. is used freely in general statements, no statistical facts have been provided. The improvement is contradicted by the present author's findings. There is virtually no evidence in this study (significant improvement in one of 33 cases) for crediting the carotid-jugular-anastomosis surgical procedure with improvement of the intellect. The majority of the patients

herein reported were tested several months after surgery, so that whatever improvement was going to occur should have been manifest, according to the statements of McKhann, Belnap, and Beck that "improvement usually begins to appear in the retarded children within the first two postoperative months."

FROM THE AUTHOR'S SUMMARY.

THE CHILD AND HIS DRAWINGS. M. POROT, Pédiatrie **38**:19 (No. 1) 1949.

By means of spontaneous drawings the author was able to determine the mental level of children and the basis of their emotional disturbances. By the same means he was even able to free a child of some neurotic manifestations by bringing to his consciousness previously obscure motives.

GLASER, Jerusalem, Israel.

RESULTS OF TREATING RETARDED CHILDREN WITH GLUTAMIC ACID. O. CONTINI-POLI, Minerva pediat. **2**:483 (Oct.) 1950.

Twenty-three mentally retarded children, 9 to 13 years of age, were fed glutamic acid for a period of six months in daily doses increasing from 4 to 18 gm. Without exception, the children showed increased vivacity and accentuation of the tendon reflexes. Intelligence quotients were determined before and after the six-month period. On the average I. Q. was increased 0.76 to 0.92%, the maximum increase being 0.29% and the minimum 0.06%. Similar improvement in intelligence was noted by the Vermeylen and the Rorschach tests and by improvement in school work. A control group of 21 children who did not receive glutamic acid showed an average increase in the I. Q. of 0.76 to 0.77%.

HIGGINS, Boston.

PATHOGENESIS OF AMAUROTIC FAMILY IDIOCY. V. BAFFI and G. AURICCHIO, Pediatria **59**:527 (July) 1951.

A case of amaurotic familial idiocy (Tay-Sachs disease) is reported in a child whose parents were second cousins. When the child was given lipocaic, together with choline and methionine, there was an increase in the urinary excretion of acetone bodies but no change in the clinical symptomatology. The probability that the pathogenesis of the disease is due to a lipid abnormality in the brain chemistry is discussed.

HIGGINS, Boston.

NATURE AND ORIGIN OF MONGOLISM. SERGIO LEVI, Riv. clin. pediat. **39**:171 (March) 1951.

Critical examination of the numerous theories giving an etiopathogenetic explanation of Mongolism showed Levi that none of these theories can answer the various questions involved. Moreover, analysis of the commonly presumed pathological factors shows that no one of them occurs with such frequency as to be considered really significant. Mongolism seems also to occur independently of either normal or abnormal conditions in parents.

Considering the fact that Mongolism always presents the unpredictable character of an exception, and that, except for a few questionable cases, it does not occur in brothers without other signs of psychosomatic abnormality and does not recur sporadically in successive generations of a family, the author thinks he can exclude the theory that Mongolism may be the pathological effect of an abnormal condition in the parents and also that it may be the effect of heredodegeneration in the classic meaning of the word.

Numerous considerations lead to the conception of Mongolism as probably a casual genetic phenomenon and to the realization that there is a digressive human type endowed with total biological inferiority.

FROM THE AUTHOR'S SUMMARY.

MENTAL HYGIENE CENTER IN THE DEPARTMENT OF CHILD CARE AT SEVILLE. ARTURO SAN MARTIN GIL, Acta pediat. españ. **9**:804 (July) 1951.

The author tells of the establishment of a mental hygiene department in the Department of Child Care and Education at Seville, Spain. The work they plan to do is to be correlated with pediatrics, psychiatry, and education and with the government facilities for the care of

abandoned infants and children. Cooperation between visiting nurses and welfare workers is to be maintained. Along with the study of neuropsychiatric and behavior problems, the program includes study of the normal child and an educational program of prevention of behavior problems.

ALLEN, San Francisco.

BODY SIZE, SEXUAL MATURITY AND MENTAL PERFORMANCE. H. STIFTER, Ztschr. Kinderh. **66**:249, 1949.

The examination of 7,100 children between the ages of 10 and 16 led to the conclusion that there was a definite positive relationship between body size, sexual maturity, and intelligence.

GLASER, Jerusalem, Israel.

DEVELOPMENTAL RETARDATION IN CHILDREN IN CONNECTION WITH SPEECH DISTURBANCE. C. WEDHOLM, Svenska läk.-tidning. **45**:438 (March 5) 1948.

The author reports the cases of three children 3 to 6 years of age who at the first examination and testing were regarded as mentally deficient. Later a more specific analysis proved that there was a marked retardation in language and other psychic functions but that the mental development in itself was normal.

WALLGREN, Stockholm, Sweden.

Diseases of Genitourinary Tract

ENURESIS. DONALD A. CHARNOCK, California Med. **75**:421 (Dec.) 1951.

Enuresis is a symptom rather than a disease. It may occasionally be the result of an organic condition, but in most cases it is functional in origin. Organic cases are rather simply classified, the diagnosis should not be difficult, and the treatment is fairly well standardized. Functional cases, on the other hand, are of a variety of types which tax the physician and the family in understanding and treating the problem.

The author presents some of the known facts about enuresis and discusses the accepted forms of therapy. An important requirement is a better understanding and study of the child from the medical, psychological, and environmental viewpoint. In this way a more rational therapy may be advised.

PRYOR, Redwood City, Calif.

ISOLATED CERVICAL LYMPHOGRANULOMA VENEREUM IN A CHILD. DANIEL ROTH and RAYMOND SCHULICK, Pediatrics **8**:489 (Oct.) 1951.

A case is reported of venereal lymphogranuloma involving a solitary cervical lymph node in a 6-year-old boy. The diagnosis was based on histologic studies and confirmed by a positive reaction to injected Frei antigen. Excision of the node followed by chemotherapy apparently effected complete cure.

FROM THE AUTHORS' SUMMARY.

SUPERNUMERARY URETER BLIND AT THE CEPHALIC END, WITH ECTOPIC OPENING INTO THE ANTERIOR URETHRA. WILLIAM A. FARMER and JOSEPH MENDELOFF, South. M. J. **44**:1002 (Nov.) 1951.

The case is reported of a 5½-year-old girl who had fever and pain in the perineum periodically since the age of 2 weeks. From the age of 2½ months a mass was known to have been present in the pelvis. There was a constant purulent "vaginal" discharge. Upon operation, a supernumerary ureter, blind at the cephalic end and opening ectopically into the urethra, was found. It was successfully removed, and the child has since remained well.

LOGAN, Rochester, Minn.

FAMILIAL RENAL INSUFFICIENCY. NORMAN S. CLARK, Arch. Dis. Childhood **26**:351 (Aug.) 1951.

The history is given of a family in which chronic renal failure developed in two members in infancy, and a third died at an early age and was found to have a hypoplastic horseshoe kidney. It is suggested that in these cases renal sclerosis is the result of some congenital defect or weakness of the kidney tissue.

KELLY, Milwaukee.

UNILATERAL RENAL VEIN THROMBOSIS TREATED BY NEPHRECTOMY AND POST-OPERATIVE HEPARIN. E. W. PARRY, Arch. Dis. Childhood **26**:358 (Aug.) 1951.

A classic case of unilateral renal vein thrombosis with treatment by nephrectomy and heparin sodium postoperatively is described. The cause is briefly chronicled. The treatment, particularly the role of surgery, is discussed.

KELLY, Milwaukee.

OLIGURIC DIABETES INSIPIDUS WITH A CONSIDERABLE REDUCTION OF THE GLOMERULUS FILTRATE. L. BARTA, Ann. pædiat. **174**:305 (May) 1950.

The diabetes insipidus of a boy aged 15 was observed. During the course of the disease spontaneous oliguria occurred. During this stage the creatinine clearance was reduced to about one-tenth of the normal; the ingestion of sodium chloride or dextrose resulted in a transient polyuria, diminished concentration of chlorine in the urine, and absolutely increased chlorine excretion. The administration of desoxycorticosterone acetate (percorten®) effected a further reduction of glomerular filtration and diminished excretion of sodium and potassium. When desoxycorticosterone acetate was administered with an extract of the posterior pituitary lobe, less potassium but more sodium were voided. When material from the posterior lobe was administered, the creatinine clearance became nearly normal and the specific gravity of the urine, varying between 1.001 and 1.003 previously, rose to 1.019. The author believes that on the basis of his examinations it is fair to assume that the reduction of glomerular filtration was due to a compensatory mechanism for the increased salt absorption in the tubules and the polyuria.

FROM THE AUTHOR'S SUMMARY.

MALIGNANT HYPERTENSION IN CHILDREN WITH UNILATERAL DISEASE OF THE KIDNEYS. W. FRISCHKNECHT, Helvet. paediat. acta **6**:414 (Nov.) 1951.

Two cases of malignant hypertension with primary unilateral renal disease are reported. In case 1 the patient was completely cured subjectively and partly cured clinically by removal of a right-sided contracted kidney of undetermined origin. Marked electrocardiographic changes and hypocalcemia became completely normal. In case 2 the patient died as a result of hypertension (cerebral hemorrhage). Autopsy showed congenital hypoplasia of the right kidney and, further, bilateral secondary malignant nephrosclerosis and generalized arteriosclerosis and atheromatosis.

Both patients showed the first symptoms in prepuberty (at 10 and 11 years, respectively). The first patient came to the hospital because of headache, and the second, because of visual disturbances. General symptoms were facial pallor, nausea, proteinuria, pyuria, microscopic hematuria, with normal or slightly raised amounts of residual nitrogen. The duration of clinical symptoms till nephrectomy was three years in the first case, and two years till death in the second case. While, according to Fanconi's hypothesis for benign hypertension (Fanconi, Ruegg, and Dierterle), the origin lies in an inflammatory irritation of the renin-producing cells, in the two cases of malignant hypertension described here a large number of glomeruli were eliminated, with the result that the much-more-dangerous mechanism of Goldblatt hypertension (glomerular ischemia) came into action.

FROM THE AUTHOR'S SUMMARY.

STONES OF THE URINARY BLADDER IN INFANCY. ALBERTO LARDELLI, Acta pediat. españ. **9**:828 (July) 1951.

The cases of three patients with stones in the urinary bladder are presented. All the stones were large and had to be removed surgically. All the patients were under 4 years old. Roentgenograms and cuts showing the stones are included. The author presents certain facts about such calculi. 1. There is a geographical factor apparent. They are said to be endemic in Dalmatia, India, Syria, Egypt, and China. 2. Many theories have been proposed, but it must always be remembered that without stasis there can be no calculi. 3. The chemical composition is variable depending on the pH of the urine and, to less extent, on other factors. 4. The symptoms depend upon the size and the position in the bladder. Painful and difficult micturition, bloody urine, and colicky pains are the usual clinical manifestations leading to the discovery

of such calculi. 5. Diagnosis may be made clinically if hematuria is accompanied by gravel passed with some pain. In larger stones, the roentgenograms are a valuable aid. Occasionally, cystoscopic and rectal examination may be valuable.

Cystitic hydronephrosis may be a complication; the sphincter may be injured by small stones, giving incontinence; ulcerations of the bladder and even fistula have been reported.

Finally, the author discusses treatment, which is surgical with the usual preoperative and postoperative medical adjuncts. In prevention, bearing in mind that the condition is mechanical, one must not forget that it is also metabolic. The patient should receive vitamin A in large amounts, and the pH of the urine should be watched. The patient should be given foods with alkaline or acid residue, depending on the pH of the urine and upon the chemical components of the crystals, whether urates, phosphates, or oxalates.

ALLEN, San Francisco.

NEW THERAPEUTIC APPARATUS FOR THE TREATMENT OF ENURESIS. CARL TRAEBER, Med. Klin. **46**:1085 (Oct. 12) 1951.

Traeber describes an apparatus designed to aid in control of enuresis. The first drops of urine close an electric circuit current, activating a bell, so that its ringing awakens the enuretic child. Good results are reported. The author seems to believe that this is a new idea.

AMBERG, Rochester, Minn.

RENAL THRESHOLD FOR BILIRUBIN. WILHELM KÜNZER, Ztschr. Kinderh. **66**:323, 1949.

According to the literature, directly acting bilirubin II (van den Bergh) begins to appear in the urine when serum levels of 2 mg. per 100 cc. are reached. Künzer reports the case of a 3-month-old infant, whose autopsy showed complete atresia of bile ducts and whose serum level of bilirubin II was over 10 mg. per 100 cc. with no bilirubin in the urine. In the absence of kidney damage, as shown by autopsy, the author demonstrates by this case that the kidney threshold must lie higher in some cases than was previously believed.

GLASER, Jerusalem, Israel.

HEMORRHAGIC KIDNEY INFARCTION IN CHILDHOOD. J. FREUND and G. BICK, Ztschr. Kinderh. **67**:23, 1949.

Hemorrhagic areas in both kidneys, macroscopically resembling infarctions and microscopically showing venous dilatations and thrombus formations, are described in a 4½-month-old infant who died with severe toxic gastrointestinal symptoms.

GLASER, Jerusalem, Israel.

INFECTIOUS VAGINAL DISCHARGE IN CHILDREN CAUSED BY STREPTOCOCCUS-BETA-HEMOLYTICUS. J. MALEK, Pediat. listy **5**:145, 1950.

A beta hemolytic streptococcus was found microscopically in the vaginal discharge of 163 girls out of 3,750 examined. The highest incidence was in the age group 6 to 10 years. After the tenth year this finding is rarer. Entering school is probably responsible for the steep rise around the sixth year. The clinical manifestations are similar to those of other infectious genital discharges in children. Prognosis is generally good and treatment successful, particularly with penicillin. Genital discharge with beta hemolytic streptococci may not only be one of the sequelae of streptococcal tonsillitis or of any other streptococcal disease but may even be directly connected with scarlet fever, either preceding the disease or appearing in its course or during convalescence. That is why a certain role can be attributed to beta hemolytic streptococci in the epidemiology of scarlet fever. Spread of scarlet fever infection by this means is possible, and the genitals cannot be excluded as a portal of entry of the infection in rare cases. It is recommended, therefore, especially during epidemics, that genital discharge be considered not only in the patients themselves but also in healthy persons in their environment, if the throat smears are negative. By this method a further factor in the epidemiology of scarlet fever might be detected and the search for carriers of beta hemolytic streptococci facilitated.

FROM THE AUTHOR'S SUMMARY.

LOCAL PENICILLIN TREATMENT OF INFANTILE VAGINAL DISCHARGE. J. MALEK and K. VESELY, Pediat. listy **5**:150, 1950.

One hundred three patients with infantile vaginal discharge were treated with penicillin. Of these, 53 were cured, 35 improved, and 15 failed to respond. These results correspond approximately with those obtained with local sulfonamide therapy.

Vaginal suppositories containing 10,000 units of penicillin or tablets with the same penicillin content were introduced into the vagina twice weekly. The duration of local treatment with penicillin was somewhat shorter than that with sulfonamides. It can be shortened still further by more frequent application and higher doses of penicillin. To insure good results patients should be admitted to children's gynecological departments.

In the authors' opinion local penicillin therapy is an important aid in the treatment of infantile gonorrhea. They consider it absolutely necessary both for successful treatment of infantile gonorrhea and for carriers of beta hemolytic streptococci.

FROM THE AUTHORS' SUMMARY.

A CASE OF DIABETES INSIPIDUS. LETTY M. DOYER, Maandschr. kindergeneesk. **19**:361 (Oct.) 1951.

Diabetes insipidus in a boy of 12 years was treated with snuff powder of the posterior lobe of the pituitary ("piton") with remarkable results. Eleven months later visual troubles appeared rather suddenly. On operation, a tumor (granuloma) was found in the neighborhood of the left optic nerve. The tumor was treated by coagulation and afterwards with x-ray. The general condition of the patient was good, but vision remained poor. It was necessary to continue the treatment with the pituitary preparation.

FROM THE AUTHOR'S SUMMARY.

A CASE OF OVARIAN AGENESIS. S. VAN CREVELD and O. M. DE VAAL, Nederl. tijdschr. geneesk. **93**:3311 (Sept. 24) 1949.

For a 14-year-old girl, with a height of 132 cm. and a weight of 35 kg., a diagnosis of ovarian agenesis was made. Besides a disturbance of statural growth she had a webbed neck, a lack of breast development, absence of axillary and pubic hair, and kyphoscoliosis, probably due to a delayed ossification of the apophyses of certain vertebrae. Besides osteoporosis and the above-mentioned osseous disturbance, the bony development was normal. The urine contained an increased amount of gonadotropic hormone and a low amount of 17-ketosteroids.

With periodic treatment with diethylstilbestrol it was possible to induce menstrual bleeding regularly. The breasts developed slightly. No hair growth followed; this might be due to a concomitant hypoplasia of the adrenal cortex. This adrenal cortex insufficiency might be compensated for by administering androgenic substances. The patient accordingly received three times a week, with a pause every fourth week, injections of 20 mg. of testosterone propionate and 5 mg. of estradiol benzoate suspended in 1 ml. of cod liver oil. After a few months of this treatment, secondary hair growth had appeared, the breasts had developed, and menstrual bleeding occurred regularly. The statural growth proceeded slowly, and the general condition improved.

VAN CREVELD, Amsterdam, Netherlands.

Diseases of Ductless Glands; Endocrinology

ADRENAL INSUFFICIENCY IN CHILDHOOD. MARGARET MULLINGER and A. L. CHUTE, Canad. M. A. J. **65**:353 (Oct.) 1951.

Two cases of adrenal insufficiency are reported in children, one 6 weeks old. One died before complete studies could be made. Attention is called to the insufficiency of mineralocorticoids. Implantation of pellets of desoxycorticosterone acetate maintained the child in good health. The literature is reviewed.

McGUIGAN, Evanston, Ill.

ADRENAL NEUROBLASTOMA: REPORT OF FOUR CASES. E. STRANSKY and N. S. FELIX, Ann. Pædiat. **176**:308 (May) 1951.

Four cases of adrenal neuroblastoma are reported. In the first the growth was a left-sided tumor with multiple metastases, involving even vertebrae and causing transverse myelitis; in the second, likewise a left-sided tumor, with liver and lung metastases; in the third, a right-sided tumor, showing skull and orbital metastases one year after removal of the primary tumor, and in the fourth, a tumor starting symptomatically with limping due to metastasis in the left femur, metastasized rapidly to the orbit and skull. Symptomatology, differential diagnosis, and therapy are discussed. In all cases, the diagnosis was established by aspiration biopsy either from the primary tumor or from the metastases.

FROM THE AUTHORS' SUMMARY.

ADRENOGENITAL SYNDROME IN CHILDHOOD. J. R. BIERICH, Ann. pædiat. **177**:241 (Oct.) 1951.

The cases of eight children with adrenogenital syndrome are reported. The urinary excretion of 17-ketosteroids, estrogens, and pregnanediol was investigated. A parallelism between certain clinical signs and changes in the metabolism of nitrogen, creatin, and minerals was observed. Symptoms of adrenal cortex insufficiency which are frequently met with make it probable that the cells of the adrenal cortex which produce androgenic steroids in unphysiological quantities are able to produce only a reduced quantity of physiological corticosteroids. Besides treatment with estrogens, a therapeutic trial with progesterone is suggested, which, via the pituitary, may check the androgen formation in the adrenal cortex.

FROM THE AUTHOR'S SUMMARY.

THE ACTION OF CHOLINE HYDROCHLORIDE ON EXPERIMENTAL HYPERTHYROIDISM AND ITS USE WITH VITAMIN A. A. DEGLI ESPOSTI, Clin. pediat. **31**:522 (Sept.) 1949.

Ten children, 8 to 15 years af age, were given three tests: (1) when thyroxin, 2 mg., was given daily for four days; (2) when thyroxin, 2 mg., and choline hydrochloride, 1 gm., were given for four days; (3) when thyroxin, 2 mg., choline hydrochloride 1 gm., and vitamin A, 150,000 units, were given for four days. Basal metabolism tests were made before medication, on the fourth day of medication, and four days after discontinuance of medication.

The tests indicate that choline hydrochloride counteracts the effect of thyroxin. The action of the choline hydrochloride did not persist long after its use was discontinued. Vitamin A does prolong somewhat the action of the choline hydrochloride.

HIGGINS, Boston.

FUNCTIONAL TESTS OF THE PARATHYROID GLANDS IN THE COURSE OF INFECTIOUS DISEASES BY MEANS OF INJECTIONS OF ESTRADIOL BENZOATE (TEST OF KLOTZ AND KLOTZ-VALENSI). E. CIFARELLI AND M. CHRISTOFANI, Minerva pediat. **2**:407 (Sept.) 1950.

The Klotz and Klotz-Valensi test is indicative of parathyroid dysfunction if the blood calcium falls in excess of 8% one to two hours following the injection of 10 to 20 mg. of estradiol benzoate. In 7 of 13 cases of measles, 4 of 7 cases of diphtheria, and 7 of 11 cases of pertussis in children, results of the tests made in the convalescent stages were positive. The tests were repeated two to three months later and all results were negative. It would appear that in these infectious diseases the parathyroid gland may suffer some toxic injury. These observations are in keeping with the not infrequent finding of a positive Chvostek sign in children with diphtheria and other infections.

HIGGINS, Boston.

IMPLANTATION OF PROTAMINE ZINC INSULIN IN INFANTILE AND JUVENILE DIABETICS. AUGUSTO WINTER, LUIS VARGAS, and JORGE LEWIN, Rev. chilena pediat. **22**:319 (Aug.) 1951.

Implants of protamine zinc insulin were done in eight diabetic patients, six children and two adolescents in order to attain a better control of the disease than through routine insulin injections.

The implants were of either pure protamine zinc insulin or of this drug with added cholesterol; they were placed in the subcutaneous tissues of the infrascapular or gluteal regions. In

three cases a partial replacement of the daily insulin dose was obtained, while in the remaining five patients a total replacement of 20 to 81 days' duration was seen. It was impossible to conclude definitely, because of the small number of cases studied, whether it is better to implant pure protamine zinc insulin or this substance with added cholesterol, although it seems as if the latter would favor more regular absorption.

FROM THE AUTHORS' SUMMARY.

FRÖHLICH'S SYNDROME WITH CRANIOPHARYNGIOMA. OSCAR CORREA BORQUEZ, Rev. chilena pediat. **22**:334 (Aug.) 1951.

A case of sex infantilism with obesity (Fröhlich's syndrome) in a 14-year-old boy is described. The condition was characterized by obesity, diabetes insipidus, hypersomnia, retarded growth, and sexual infantilism. Roentgenograms of the skull revealed a calcified suprasellar cyst. Because of a steady down-hill trend, a right frontal craniotomy was done and the cyst tapped, with removal of about 50 cc. of an oily yellowish fluid containing cholesterol. After a brief clinical improvement, the symptoms recurred, severe respiratory disturbances were noted, and the patient died. At autopsy a craniopharyngioma of the shape and size of a hen's egg was found, reaching from the anterior portion of the cerebral peduncles to the anterior part of the third ventricle. Histologic examination of the tumor showed a capsule with excrescences of squamous epithelium, some of them calcified, on its inner surface.

FROM THE AUTHOR'S SUMMARY.

17-KETOSTEROID EXCRETION AS INDICATION OF AN INFLUENCE OF METEOROLOGICAL FACTOR ON THE ORGANISM. MARIANNE UTERS, JÜRGEN HOFSCHLAEGER, HANS-ULRICH ANTON, and WILHELM ZIMMERMANN, Deutsche. med. Wchnschr. **76**:1408 (Nov. 9) 1951.

The 17-ketosteroid excretion was studied by repeated determinations for four weeks for two normal persons, an adult and an 11-year-old girl. At a time of unusual meteorological condition, characterized mainly by an unusually low relative humidity, a striking increase of the 17-ketosteroid excretion in the urine was noted in both persons.

AMBERG, Rochester, Minn.

Diseases of Muscles, Bones, Joints, and Lymph Nodes

THE DIFFERENTIAL DIAGNOSIS OF MALIGNANT BONE TUMORS. MARK B. COVENTRY, Ann. Surg. **132**:888 (Nov.) 1950.

Bone sarcoma most frequently affects relatively young persons. Its highest point of incidence is among persons of 15 to 20 years of age. Intermittent or continuous pain is the symptom of importance in bone tumors. It usually precedes any objective evidence of a tumor. Occasionally in lower extremities a limp will precede the actual occurrence of pain. Diagnosis of bone tumors from roentgenographic findings alone is unreliable. All factors must be considered, including a careful history, complete physical examination, essential laboratory studies, roentgenograms, and, most important, surgical biopsy.

Five cases in patients ranging in age from 6 to 64 years are reported.

BANTIN, Omaha.

TESTOSTERONE IN PROGRESSIVE PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY. MEYER A. PERLSTEIN and HENRY GUTTERMAN, J. Pediat. **37**:743 (Nov.) 1950.

Testosterone propionate or methyl testosterone, in addition to affecting secondary sex characteristics, will increase the mass of skeletal muscle when given to human beings. Also, subjects receiving testosterone propionate excrete less urinary nitrogen and creatine. Since pseudohypertrophic muscular dystrophy is characterized by muscle weakness, muscle wasting, and creatinuria, it has been suggested that testosterone might be of value in this condition. This was not found to be true. Eleven boys with this disease were given enough methyl testosterone to promote the appearance of secondary sex characters. Most said that they felt better while taking the drug, but no sustained clinical improvement was seen. Two patients

became worse while taking testosterone. One patient became worse when administration of the drug was stopped. Methyl testosterone is of no value in the treatment of pseudohypertrophic muscular dystrophy.

MACDONALD, Pittsburgh.

INFANTILE CORTICAL HYPEROSTOSES: A REVIEW OF CASES WITH A CASE REPORT. WILLIAM S. THOMAN and ROBERT E. MURPHY, Radiology **54**:735 (May) 1950.

In 24 cases from the literature, the age at onset varied from 1 to 130 weeks. Only two infants were under 7 weeks old. There was leucocytosis in all but three patients (13,000 to 29,000 white blood cells). All but two were considered to be irritable, and all but three had fever. All recovered.

The authors' patient was a 3-month-old Sioux Indian boy. The chief complaint was swelling of the extremities of six weeks' duration. Roentgenograms showed cortical hyperostoses of the left femur and right humerus. There was marked regression of the lesion seven weeks after admission to the hospital. Clinical recovery occurred at the end of 11 weeks in the hospital. No special treatment was given.

This reviewer has just seen these changes on a roentgenogram of an unborn fetus. Roentgenograms taken 24 hours after birth showed advanced changes in the mandible, both radii, and both tibiae. Secondary changes were seen in both ulnae and both fibulae.

ANSPACH, Chicago.

END RESULT STUDY OF CONGENITAL COXA VARA: TREATED BY THE HAAS TROCHANTERIC OSTEOTOMY. W. M. ROBERTS, South. M. J. **43**:389 (May) 1950.

A report is presented of 10 years' follow-up of five patients with unilateral coxa vara treated by the Haas technique. This procedure consists of transtrochanteric osteotomy, plus skeletal traction through the lower end of the femur. The results were good.

LOGAN, Rochester, Minn.

MYOSITIS FIBROSA GENERALISATA. A. M. STEWART and A. R. MACGREGOR, Arch. Dis. Childhood **26**:215 (June) 1951.

The authors present the symptomatology and pathology of recorded cases of myositis fibrosa generalisata and describe an additional case. Evidence suggests that the disease is not a separate clinical and pathological entity but a form of progressive muscular dystrophy.

KELLY, Milwaukee.

CONGENITAL MYASTHENIA GRAVIS. R. I. MACKAY, Arch. Dis. Childhood **26**:289 (Aug.) 1951.

A case of congenital myasthenia gravis in one of binovular twins is described. No latent myasthenic state could be demonstrated in the twin or the parents by injection of tubocurarine chloride. Arising out of this study, certain speculations are made on the origin of myasthenia gravis.

KELLY, Milwaukee.

POLYOSTOTIC FIBROUS DYSPLASIA. P. W. VERCO, Clin. Rep. Adelaide Child. Hosp. **2**:45 (May) 1951.

The syndrome of polyostotic fibrous dysplasia is discussed, and a case is presented. Roentgenologic findings are stressed.

MCGUIGAN, Evanston, Ill.

INSULIN IN PROGRESSIVE MUSCULAR DYSTROPHY IN CHILDREN. E. MAYERHOFER, Ann. pædiat. **174**:316 (May) 1950.

Mayerhofer obtained excellent results from the systematic treatment of progressive muscular atrophy with small to medium doses of insulin. Especially in recent cases in which advanced muscular wasting and pseudohypertrophy were still absent, patients were quickly "put on their feet" again. The author thinks that the cause of this functional improvement should be looked for in the increased formation, better storage, and improved consumption of glycogen in the diseased muscle itself.

FROM THE AUTHOR'S SUMMARY.

HYPERTROPHIC MUSCULATURE OF THE INFANT. S. LECOMTE-RAMIOUL and R. HOUET, Ann. pædiat. **174**:326 (May) 1950.

Case histories of two infants with generalized muscular hypertrophy and motor disturbances are presented. The first infant also shows idiocy and so represents the "wrestler" type of de Lange; the second shows congenital hypothyroidism. Differential diagnosis is discussed.

FROM THE AUTHORS' SUMMARY.

NONSYPHILITIC OSTEOCHONDRITIS. F. GERLOCZY and K. GEFFERTH, Ann. pædiat. **177**:374 (Dec.) 1951.

In connection with an acute abscess caused by Micrococcus pyogenes aureus in a baby 4 weeks old, we observed a generalized osteochondritis. The generalized osteochondritic changes regressed very quickly. The Wassermann reaction of the patient, the mother, and the maternal grandparents was negative, as well as that of the father and three of the father's siblings. On the maternal side as far back as five generations and on the paternal side as far as four generations nothing pointing to syphilis could be found in the family history.

FROM THE AUTHORS' SUMMARY.

POSTPUNCTURE OSTEOMYELITIS OF INFANTS. R. GARSCHE, Schweiz. med. Wchnschr. **81**:1131 (Nov. 17) 1951.

A 5-month-old infant with meningitis due to colon bacilli, which were isolated up to the 20th day from the spinal fluid, received injections of Ringer's solution and dextrose with penicillin into the bone marrow of the right and left tibias. The meningitis responded to penicillin and streptomycin in 31 days. Ten days after the injection into the bone marrow of the right tibia, the first signs of an osteomyelitis could be seen upon roentgenologic examination, and these signs became pronounced in the further course, without having shown any local evidence of an infection at the site of the puncture until the 50th day, when an infiltration was noted which promptly became purulent. Upon operation, a colon bacillus of the same type, isolated from the spinal fluid, was cultured. This finding practically excluded infection from the puncture. The osteomyelitis cleared up with penicillin and streptomycin treatment. In another infant, one month old and erythroblastic, the heel puncture was done to obtain blood for examination. An abscess formed which progressed to produce osteomyelitis of the calcaneus, due to Staphylococcus (Micrococcus). It yielded to treatment with penicillin. That the infection did not produce more severe effects is explained by repeated short treatment with penicillin because of the abscess formation at the site of the puncture.

AMBERG, Rochester, Minn.

ADENOCYTOGRAM IN NORMAL INFANTS. GIANNANTONIO STEGAGNO, Arch. ital. pediat. e puericolt. **13**:273, 1949.

Lymph node puncture with subsequent aspiration appears to be a valuable technical procedure for the diagnosis of systemic affections of the lymphatic tissue, as compared with the usual biopsy. Its use in pediatrics is encouraged, as it is a simple technique which does not require particularly fine skill or delicate equipment.

The purpose of the present study has been to get acquainted with the adenocytogram (composition of lymph nodes in per cent) in normal children. Smears were obtained by aspiration after the puncture of hardly palpable lymph nodes in 20 thin healthy youngsters. The composition of the secretion of the lymph nodes (differential count) was as follows: lymphoblasts 1.01%; prolymphocytes (young lymphocytes) 10.83%; hemocytoblasts 0.21%; monoblasts 0.03%; plasma cells 0.32%; mast cells 0.22%. Such percentages approach closely the figures given by Michelazzi and De Renzi for adults, except for that of the prolymphocytes, which is remarkably lower in Stegagno's study (10.0% as compared with 43.6%).

FROM THE AUTHOR'S SUMMARY.

COMBINED APPEARANCE OF PROGRESSIVE MUSCULAR DYSTROPHY AND ADIPOSITY. H. KIRCHMAIR and F. PAULY, Ztschr. Kinderh. **66**:341, 1949.

The case of a 13-year-old girl with adiposity, mental and physical retardation, and muscular dystrophy is described. The author concludes that the common cause of this symptom complex and thus also of the muscular dystrophy is cerebral damage in the region of the hypophysis and mesencephalon.

GLASER, Jerusalem, Israel.

Diseases of Eye

ELECTROENCEPHALOGRAM AND EYE DISORDERS. J. D. LEVINSON, ERNA L. GIBBS, M. L. STILLERMAN, and M. A. PERLSTEIN, Pediatrics **7**:422 (March) 1951.

A preliminary report is presented of electroencephalographic studies, in both waking and sleeping states, on 1,281 children under 16 years old, with respect to the presence of eye abnormalities, particularly strabismus. Thirty per cent of 36 children with strabismus but no other abnormalities, and only 0.5% of 180 entirely normal children, showed occipital abnormalities on electroencephalograms.

In children with organic brain disease causing cerebral palsy, electroencephalographic foci in the occipital region occurred almost twice as frequently in the presence of abnormal eye findings. This relationship prevailed regardless of the presence or absence of seizures. In patients with eye disorders, electroencephalographic foci involving the occipital region were six times more common than all other foci combined.

On the basis of this study, the authors believe that for children who show some neuro-ocular disorder a careful study of the electroencephalograms should be made for detection of a possible central basis for the pathology. Conversely, patients who show an occipital focus should have a thorough ophthalmologic examination to rule out eye abnormalities.

FROM THE AUTHORS' SUMMARY.

EPICANTHUS INVERSUS, CONGENITAL PTOSIS OF THE EYELID, AND DIFFICULTIES IN OCULAR MOTILITY IN A 7-MONTH-OLD BABY. F. PERABO and L. HOLLANDER, Helvet. paediat. acta **6**:361 (Aug.) 1951.

The authors describe a case of epicanthus inversus associated with congenital lid ptosis and limitation of movement of the ocular musculature. The changes described are discussed in relation to the group of multiple congenital malformation syndromes.

FROM THE AUTHORS' SUMMARY.

POST-TRAUMATIC, FUNCTIONAL PALPEBRAL PTOSIS IN A YOUNG GIRL. M. SCHACHTER, Minerva pediat. **3**:407 (July) 1951.

Following a hard accidental blow by the elbow of a playmate, an almost complete ptosis of the left eyelid developed in a girl of 15 years. Ophthalmological examination indicated that the ptosis was functional. The child's past history revealed that she was an orphan, nervous and insecure. Various psychological studies were made, and a rational social and educational therapy was outlined.

HIGGINS, Boston.

Cutaneous Diseases; Allergy

ALLERGY AS A FACTOR IN CHILDHOOD SINOBRONCHITIS. WALTER C. PRICE and IRWIN A. SOLOW, J. Allergy **22**:4 (Jan.) 1951.

A group of 62 children with family history or patient history of acute or chronic allergy was selected from a group of 331 children admitted to the hospital with a history of chronic respiratory disease. Roentgenographic evidence of sinobronchial disease was present in 64% of the children under 5 years of age. In 57% of the allergic children who had positive skin-test reactions, sinobronchitis was noted. A ready susceptibility to lower-respiratory-tract infection was evident when there was a familial factor of allergy together with positive skin-test reactions.

HOYER, Cincinnati.

THE RELATIONSHIP OF THE ETIOLOGIC FACTORS IN ASTHMA IN INFANTS AND CHILDREN. ROBERT CHOBAT, IRVING H. UVITSKY, and HAROLD DUNDY, J. Allergy **22**:106 (March) 1951.

The records of 400 children whose asthma began before they were 3 years old were studied. The children had complete physical examinations. Thorough histories were elicited, and otolaryngological, roentgenologic, and laboratory examinations, including intradermal tests were done. The purpose of the study was to determine the relative importance of foods, inhalants, and infections as a cause of asthma.

In this study infections were found to play a major role, foods a minor role, and inhalants a role in between. A single cause of asthma was found in 41% of the children; infections were the cause in 30.5%, inhalants in 10.25%, and foods in 0.25%. Combined factors were the cause in 59% of the children. Infection, alone and combined with other causes, was found in 87.25%; inhalants, alone and combined, in 64.5%, and foods, alone and combined, in 15.0% of the children.

HOYER, Cincinnati.

RECOGNITION OF MERCURY IN THE URINE AND ITS IMPORTANCE FOR DIAGNOSIS OF ACRODYNIA. H. ZELLWEGER and S. WEHRLI, Helvet. paediat. acta **6**:397 (Nov.) 1951.

Of 54 patients with erythredema polyneuropathy (acrodynia), 44 received mercury treatment, in most cases before the beginning of the disease, rarely afterwards. In 10 of 18 patients for whom examination for mercury was done, mercury excretion was found once or twice in the urine in small amounts up to 374 γ. In one patient with erythredema polyneuropathy in whom mercury excretion was tested a very undulant daily excretion of between 0 and 43 γ could be observed continually between the 103d and 126th days after ingestion of 0.3 gm. of mild mercurous chloride. In five nonacrodynic children treated with 1 to 1.5 gm. of mild mercurous chloride, the daily mercury excretion was tested during several months, and a very undulant urinary output of mercury, lasting several months, could be observed.

In summary, the authors reported the following results. 1. In patients with erythredema polyneuropathy, who received mercury treatment shortly before or after the start of the disease, mercury excretion in the urine could be found for several months. The daily output varied from none to several hundred micrograms. 2. In healthy children who received a therapeutic dose of mercury the same mercury excretion was observed as in children with erythredema polyneuropathy. 3. The amount of urinary mercury excretion is similar in healthy children, in erythredema polyneuropathy, and in chronic mercury poisoning. Therefore the amount and duration of mercury output in the urine are not conclusive proof of the diagnosis of erythredema polyneuropathy or mercurialism.

FROM THE AUTHORS' SUMMARY.

Surgery and Orthopedics

ORTHOPEDIC TREATMENT OF THE PIGEON-TOED CHILD. WALTER SCOTT and CHARLES G. HUTTER, J. Pediat. **37**:243 (Aug.) 1950.

The child who sleeps on his abdomen with his toes pointing in and the child who likes to sit with his legs curled and feet turned in under the buttocks, Japanese fashion, are both likely to be pigeon-toed. Such postures create internal torsion of the tibea and pigeon-toed gait results. Overcorrection with a Denis Browne night splint will correct the deformity in from three to six months. Duck-toed gait may be treated with the same splint overcorrected in internal rotation.

MACDONALD, Pittsburgh.

EARLY USE OF ACTH IN A SEVERE BURN. HENDRIK DE KRUIF and NORMAN H. BAKER, Minnesota Med. **34**:1092 (Nov.) 1951.

The case of a 9-year-old boy, burned extensively by gasoline, is reported. Corticotropin (ACTH) therapy, in doses of 25 mg. every six hours, was begun within two hours of the time of the burn. The results suggest that corticotropin, when used immediately and in conjunction with other therapeutic measures, profoundly shortened the course of healing, prevented scarring by rapid epithelization, and perhaps made skin grafting unnecessary.

FROM THE AUTHORS' SUMMARY.

Teeth and Dentistry

DENTAL CARIES. GEORGE O. BOUCHER, California Med. **74**:128 (Feb.) 1951.

The most generally accepted theory as to the cause of dental caries is that certain bacteria in the mouth, in the presence of fermentable sugars, cause the formation of acids which in turn decalcify teeth. Physicians may help reduce the incidence of caries by recommending elimination of refined sugars from the diet or, at least, control of the amount consumed.

Cleaning the teeth with a well-designed tooth brush after each meal will to a certain extent mechanically remove the fermentable sugar and debris from the teeth. One step further in oral hygiene that may be beneficial is the use of a dentifrice with 5% dibasic ammonium phosphate and 3% urea to reduce the formation of acid. Anything that will increase salivation will aid in buffering any acids that may be present. A 2% solution of sodium fluoride applied to the thoroughly dried "intact" enamel surface may prevent caries. Sodium fluoride added to drinking water to a concentration of one part per million is utilized by the body in the formation of an enamel that is particularly resistant to caries.

PRYOR, Redwood City, Calif.

BRACHIAL PLEXUS BLOCK ANESTHESIA IN CHILDREN. GEORGE A. SMALL, J. A. M. A. **147**:1648 (Dec. 22) 1951.

Brachial plexus block anesthesia was used in 125 children, between the ages of 15 months and 12 years, without difficulty. It is useful in surgery of the upper extremity when a general anesthesia is not desirable.

KIMBALL, Evanston, Ill.

DENTAL CARIES IN SCHOOL CHILDREN. J. MIKSA, Pediat. listy **6**:340 (No. 3) 1950.

A brief statistical review is given of the teeth of Czechoslovak school children, aged 6 to 14. Dental caries in the milk dentition varied between 20.08 and 45.33% and in the permanent dentition between 12.60 and 26.05%. In the 14-year-old age group the average number of carious teeth were 5.51 per boy and 7.13 per girl. If the 32 teeth are considered as 100%, this gives a percentage of decayed teeth of 17.21 in boys and 22.27 in girls. A comparison of the figures for Bohemia, Moravia, and Slovakia showed the lowest incidence of dental decay in Slovakia in both boys and girls and in both milk and permanent teeth. The therapeutic care of carious teeth is discussed, and the importance of close cooperation between dental surgeons, pediatricians, and general practitioners in the prevention of dental caries in stressed.

FROM THE AUTHOR'S SUMMARY.

News and Comment

GENERAL NEWS

Specialists Certified by American Board of Pediatrics, Inc.—The following physicians were certified as specialists by the American Board of Pediatrics, Inc., after examinations held at St. Louis, March 21, 22, and 23, 1952.

Bash, Wallace E., Fort Wayne, Ind.
Beard, Alice H. Gamble, Little Rock, Ark.
Beck, Karl Henry, Wauwatosa, Wis.
Behrer, M. Remsen, St. Louis.
Bradlow, Paul A., Fort Knox, Ky.
Brigham, Dwight Peter Bent, Omaha.
Burnett, John Daniel, Toledo, Ohio.
Carabello, Charles A., Reading, Pa.
Clark, Earl Howard, Rock Island, Ill.
Cleland, William David, Jr., Port Huron, Mich.
Coffey, John Dixon, Jr., Natchez, Miss.
Diaz, Joseph A., Hampton, Va.
Du Vivier, Edward Keyes, Alton, Ill.
Dworsky, Alexander, Memphis.
Frey, William B., South Bend, Ind.
Friedman, Alvin Burton, Cleveland.
Garrard, Sterling Davis, Palos Heights, Ill.
Gibbs, Reagan Howard, Galveston, Texas.
Grant, Robert Sherbert, Lincoln, Neb.
Graubarth, Harry N., New Orleans.
Green, Charles E., Lawton, Okla.
Griffin, Max Eugene, Evansville, Ind.
Harrel, John Allen, Jr., Little Rock, Ark.
Hepner, Walter Ray, Jr., Galveston, Texas.
Herweg, John O., St. Louis.
Hess, Paul Patrick, New Albany, Ind.
Hopkins, Charles E., Madison, Wis.
Horner, Frederick A., Denver.
Kahn, Lawrence, St. Louis.
Kehoe, Joseph Louis, Davenport, Iowa.
LaDriere, Raymond Joseph, St. Louis.
Lavender, Clinton Frederick, Sandusky, Ohio.
Mazur, Herbert Arthur, St. Louis.
Moore, Herbert R., Dayton, Ohio.
Morris, Hyman Rubin, Gary, Ind.
Nilsson, Donald Charles, Omaha.
Parker, George F., Jr., Indianapolis.
Pierce, Alexander W., Wichita Falls, Texas.
Preston, Lewis Frederick, Oak Ridge, Tenn.
Reames, Harold R., Kalamazoo, Mich.
Riley, William Gail, Meridian, Miss.
Rosenbaum, Percy, New Orleans.
Roth, Bertram Stanley, Indianapolis.
Sanders, Dan S., Jr., Nashville, Tenn.
Shirkey, Harry Cameron, Cincinnati.
Singleton, Jack W., San Angelo, Texas.
Slaughter, George William, Wichita Falls, Texas.
Spevak, Jack, Des Moines, Iowa.
Stem, James Marion, Clearwater, Fla.
Stillwater, Karl, Detroit.
Strick, Marvin H., Benton Harbor, Mich.
Sutphin, John Blackwell, Joplin, Mo.
Wheeler, Carl Lewis, Jr., Lexington, Ky.
Wheeler, Robert Channing, Evanston, Ill.
Williams, Hugh Roberts, Atlanta.
Young, Theodore Everette, Oxford, Kan.

ANNOUNCEMENTS

Kappa Delta Award for Research in Orthopedic Surgery.—A prize of $1,000 donated by the Kappa Delta Sorority may be awarded annually by the American Academy of Orthopaedic Surgeons for the best research related to orthopedic surgery and performed by an American citizen in the United States. This research must be presented to the Committee on Scientific Investigation of the American Academy of Orthopaedic Surgeons before Nov. 1, 1952. Researchers interested in competing for this prize are requested to secure further information from Dr. Claude N. Lambert, 104 S. Michigan Ave., Chicago 3, Chairman of the Award Committee for 1952.

Opening for Fellow in Pediatric Cardiology.—An immediate opening for a Fellow in Pediatric Cardiology is now available in the children's division of Cook County Hospital, where there are unusually large inpatient and outpatient departments. Training in angiocardiography and catheterization is available if desired. The salary is $3,600 per year. Further details may be obtained from Dr. Benjamin M. Gasul, 700 S. Wood St., Cook County Children's Hospital, Chicago.

PERSONAL

Award for Dr. Alfred H. Washburn.—Dr. Alfred H. Washburn, Director of the Child Research Council at the University of Colorado, has been granted an award of $1,000 by Lord & Taylor Awards.

Birthday of Dr. E. Glanzman to Be Celebrated.—Dr. E. Glanzman, Director of the Pediatric Clinic in Bern, Switzerland, celebrated his 65th birthday on April 12, 1952. Many European pediatricians took part in this celebration. Dr. Glanzman is best known in the United States for his hematological contributions (anaphylactic purpura) and for his excellent textbook of pediatrics, already in its third edition. He has published about 150 papers covering many other pediatric subjects, among which are studies on constitution, growth, vitamins, glandular fever, three-day fever, rheumatic infection, and psychology.

Appointment for Dr. Katharine Dodd.—Dr. Katharine Dodd has assumed the position of Professor and Head of the Pediatric Department at the University of Arkansas School of Medicine, succeeding Dr. William A. Reilly. Dr. Dodd was formerly Associate Professor of Pediatrics at the University of Cincinnati.

DEATHS

Death of Dr. Geoffrey B. Fleming.—Dr. Geoffrey B. Fleming, formerly Professor of Medical Pediatrics, Glasgow University, died recently. He had been associated with the Royal Hospital for Sick Children for 35 years. He was a well-known and much-respected pediatrician, and his loss will be keenly felt. Dr. Fritz B. Talbot writes concerning him

"I have corresponded with him since the first world war when our interests in research were identical. As a visitor in our home he was an ideal guest. . . . I felt always he had the American approach to research. He assessed conditions coolly, honestly, and wisely, so that like John Howland and others of his ilk, his advice was always good and his conclusions dependable."

Books

Child Psychiatry in the Community: A Primer for Teachers, Nurses, and Others Who Care for Children. By H. A. Greenberg, M.D., in collaboration with J. H. Pathman, Ph.D.; H. A. Sutton, R.N., B.A., B.S., and M. M. Browne, B.A., M.A. Price, $3.50. Pp. 296, with 5 tables and 6 pp. of forms. G. P. Putnam's Sons, New York, 1950.

This is the first edition of a book which is important enough to go on to additional editions in years to come. It is a book which places the proper great emphasis upon the clinic-team approach to community child psychiatry. In addition, one of the most important things about this book is that it defines child psychiatry as a concern and responsibility of many more persons than psychiatrists and ancillary professional personnel. In fact, the authors direct this book to those who are charged with the everyday care of children. Again, this takes child psychiatry into the community, and there are few who would not profit by reading this book.

The subject matter is divided into three well-organized parts: the Child, the Clinic Team, and the Clinic and the Community. Part one begins with a short chapter on the history of child guidance clinics in the United States. There follow chapters on personality development, psychogenesis of behavior problems, symptoms and diagnosis, prognosis, the treatment process, and the collaborative approach to therapy. The approach is oriented by psychoanalytic concepts which are adequately illustrated by case material. The presentation is clear and not hampered by too many psychiatric and psychoanalytic terms.

Part two contains a chapter devoted to each member of the clinic team. The chapters concerning the psychologist and the social worker were written by the member of each of these professions who collaborated with Dr. Greenberg. The role of each member of the clinic team is clearly

presented. Even though these stated roles may vary somewhat in different clinics throughout the country, these chapters bring welcome information to those who do not understand the functional approach of the clinic team.

Part three brings into focus some of the relationships between the clinic and the community. The first chapter discusses the role of psychiatric consultants in children's institutions. The second chapter elaborates on the first by taking as its subject the emotional problem seen in a hospital-school for crippled children. A chapter on child guidance and the nurse, by the nurse collaborating as author, and a chapter on child guidance and the teacher emphasize the importance and function of the members of those two professional groups as members of the total team for bringing child psychiatry into the community and the community into child-psychiatry participation. There is also a chapter on the author's concept of the relationship of the child guidance clinic to juvenile delinquency. In the last chapter, Dr. Greenberg takes an optimistic but somewhat guarded look into the future of child psychiatry.

There is a nine-page appendix which includes a statistical summary and intake forms from the Institute for Juvenile Research, Chicago. A glossary of terms and a selected reading test are included at the end of the book. This book is highly recommended to pediatricians who would keep up with their growing responsibility in the area of child psychiatry in the community.

Diseases of Children. Sixth edition. By Bruce Williamson. Price, $4.50. Pp. 445, with 389 illustrations. Williams & Wilkins Company, Mount Royal and Guilford Aves., Baltimore, 1951.

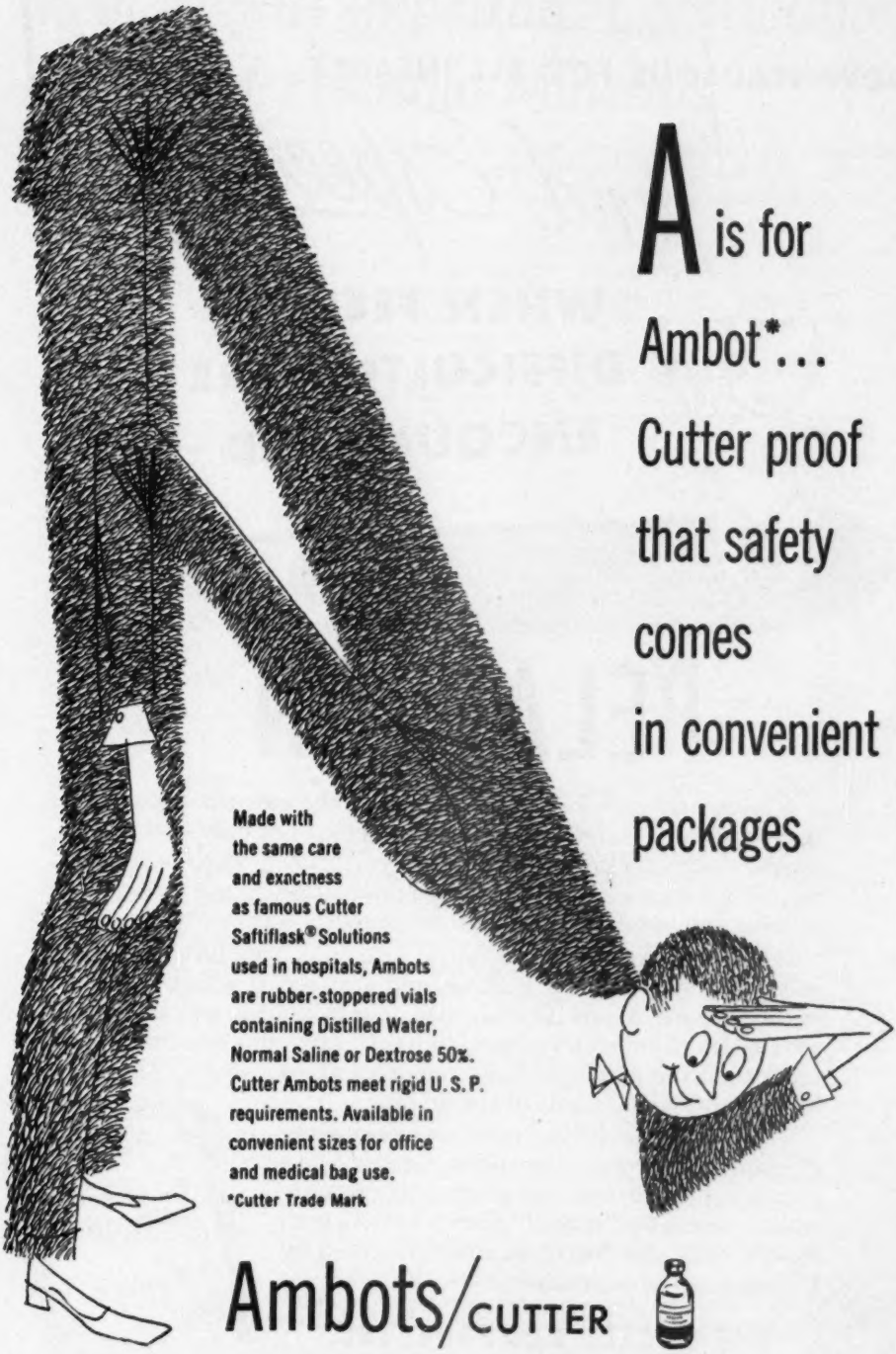
This small volume is apparently a popular text among students and practitioners in Britain, as indicated by the appearance of six editions since 1933. The present edition has been thoroughly revised and brought up to date. The text is arranged systematically, although, in contrast to the usual practice, infant care and feeding are discussed in the last chapter. In content, the scope of the book is exceptionally inclusive for such a small volume. The treatment of the various subjects is necessarily sketchy and therefore is frequently of little value.

Several points of variation from American opinion are worthy of mention. Laryngotracheobronchitis, as such, is not mentioned, laryngitis stridulosa apparently having a place comparable to croup. The gravity of this disease is not stressed, and treatment is virtually ignored. Lobar pneumonia is mentioned as the most common lung infection in childhood, above bronchitis and bronchopneumonia, which is certainly not the case in this country. Empyema is treated by drainage, but the modern use of antibiotics is not mentioned.

The text is easy to read and interesting in the difference of viewpoint. Its greatest fault is its brevity, and the same could be said of any book of its size. In its field it is the equal of, or superior to, any American book.

CORRECTION

The secretary of the Dallas Pediatric Society is Dr. Charles L. Smith, 4207 Lemmon Ave., Dallas, not Dr. Dan S. Sanders Jr., as was stated in the Directory of Pediatric Societies, in the April issue, page 570.



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APPROXIMATE MINERAL CONTENT OF MEATS

200 Gm. (approx. 7 oz.),[1] Edible Portion (Uncooked)

	Beef Round	Lamb Leg	Pork Loin	Veal Shoulder
Minerals, total[2]	2.0 Gm.	1.8 Gm.	1.8 Gm.	2.0 Gm.
Calcium[3]	22 mg.	20 mg.	20 mg.	22 mg.
Chlorine[3]	147 mg.	136 mg.	125 mg.	147 mg.
Copper[3]	0.2 mg.	0.2 mg.	0.2 mg.	0.2 mg.
*Iodine[4] (Ohio animals)	0.02 mg.	0.03 mg.	Data not available	0.01 mg.
Iron[3]	5.8 mg.	5.4 mg.	5.0 mg.	5.8 mg.
Magnesium[3]	46 mg.	42 mg.	39 mg.	46 mg.
Phosphorus[3]	360 mg.	426 mg.	372 mg.	398 mg.
Potassium[3]	661 mg.	610 mg.	559 mg.	661 mg.
Sodium[3]	164 mg.	152 mg.	139 mg.	164 mg.
†Cobalt[3]	0.0002 mg.	———	Data not yet available	———
†Manganese[3]	0.03 mg.	0.03 mg.	0.02 mg.	0.03 mg.
†Zinc[3]	9.4 mg.	———	Data not yet available	———

*Iodine content of meat varies with the iodine content of feed of the animals.
†Needed in trace amounts only.

The average values for iron, phosphorus, and copper of the four kinds of meat shown constitute about 46, 25, and 100 per cent, respectively, of the National Research Council's recommended daily allowances for adults, and the average values for chlorine, potassium, and sodium constitute about 14, 63, and 16 per cent, respectively, of the estimated daily adult needs, as based on mineral balance studies.[6] Although no specific information is available on the quantitative needs for cobalt, magnesium, manganese, and zinc, nutrition information would suggest that the amounts reported above may have nutritional importance or significance.

In addition to its notable content of minerals, meat also furnishes large amounts of biologically complete protein and important amounts of vitamin B complex, which includes biotin, choline, folic acid, inositol, niacin, pantothenic acid, pyridoxine, riboflavin, thiamine, and vitamin B_{12}. On the basis of its rich contribution of nutritional essentials, meat well deserves its prominent place in the daily diet of the American people, the world's best-nourished people.

1. Recent estimates of the U. S. Department of Agriculture indicate that the per capita consumption of meat in the United States approaches seven ounces per day.
2. Watt, B. K., and Merrill, A. L.: Composition of Foods—Raw, Processed, Prepared, In Agriculture Handbook No. 8, United States Department of Agriculture, 1950.
3. Estimated on basis of protein content of meats. Sherman, H. C.: Food Products, ed. 4, New York, The Macmillan Company, 1948, p. 155.
4. Ohio animals; varies with iodine content of feed. Johnson, H. J.: Bridges' Dietetics for the Clinician, ed. 5, Philadelphia, Lea & Febiger, 1949, p. 800.
5. Mitteldorf, A. J., and Landon, D. O.: Analytical Chemistry; Spectrochemical Analysis of Beef for Mineral-Element Content, Armour Research Foundation of Illinois Institute of Technology. In Press.
6. Dauphinee, J. A.: Sodium, Potassium, and Chloride Malnutrition, Including Water Balance and Shock, in Jolliffe, N.; Tisdall, F. F., and Cannon, P. R.: Clinical Nutrition, New York, Paul B. Hoeber, Inc., 1950, p. 341.

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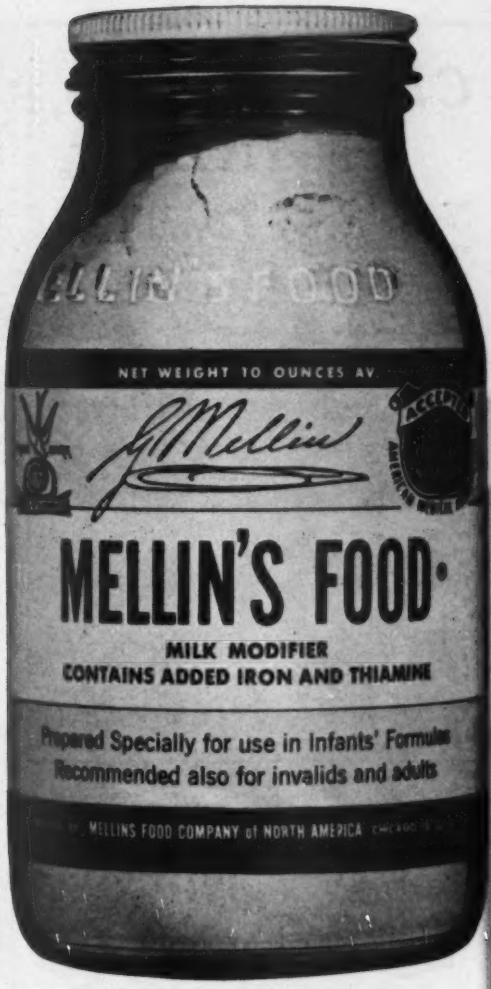
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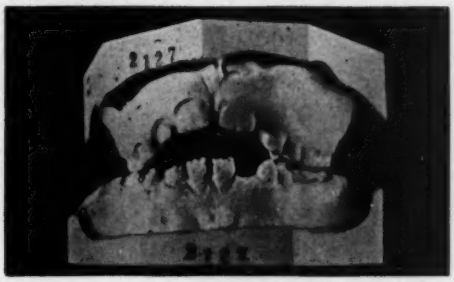

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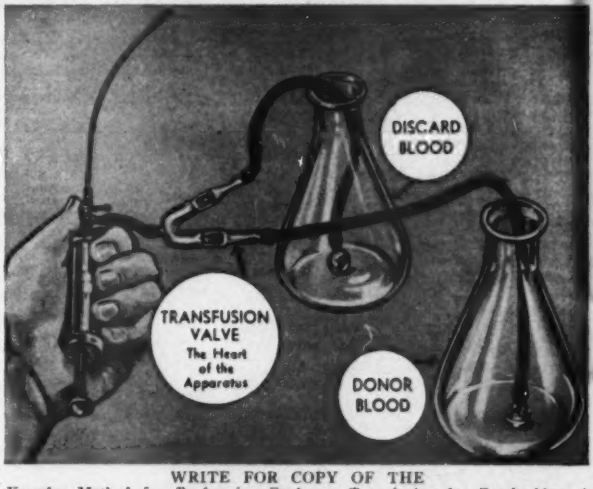

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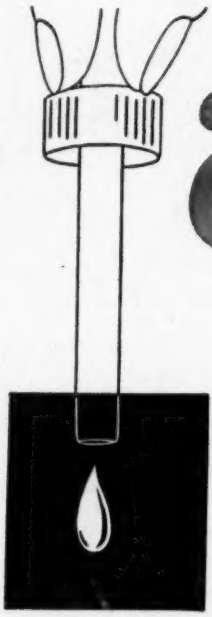

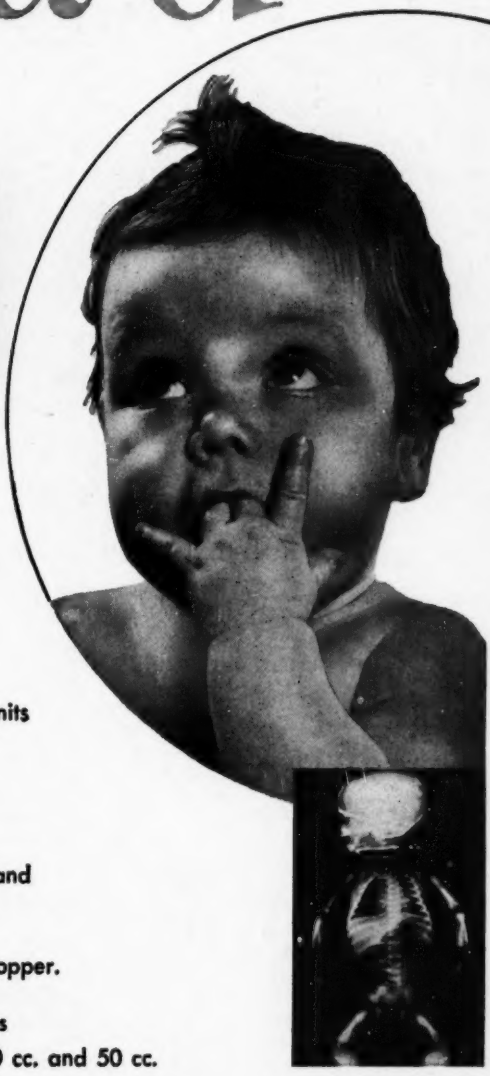

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